VOL. XXX. No. 5 MAY 1945

MECCANO MAGAZINE

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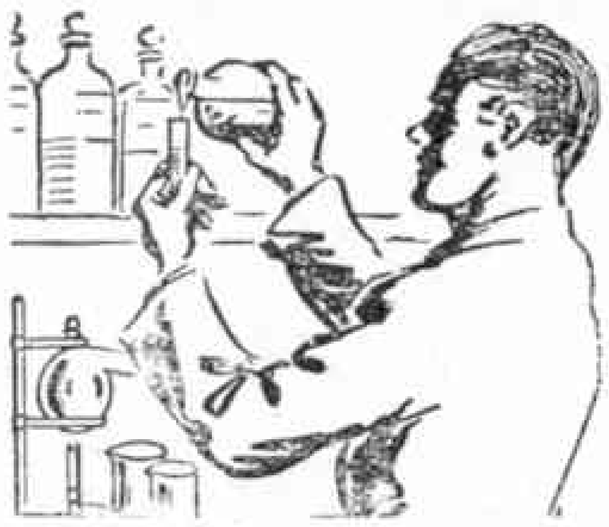

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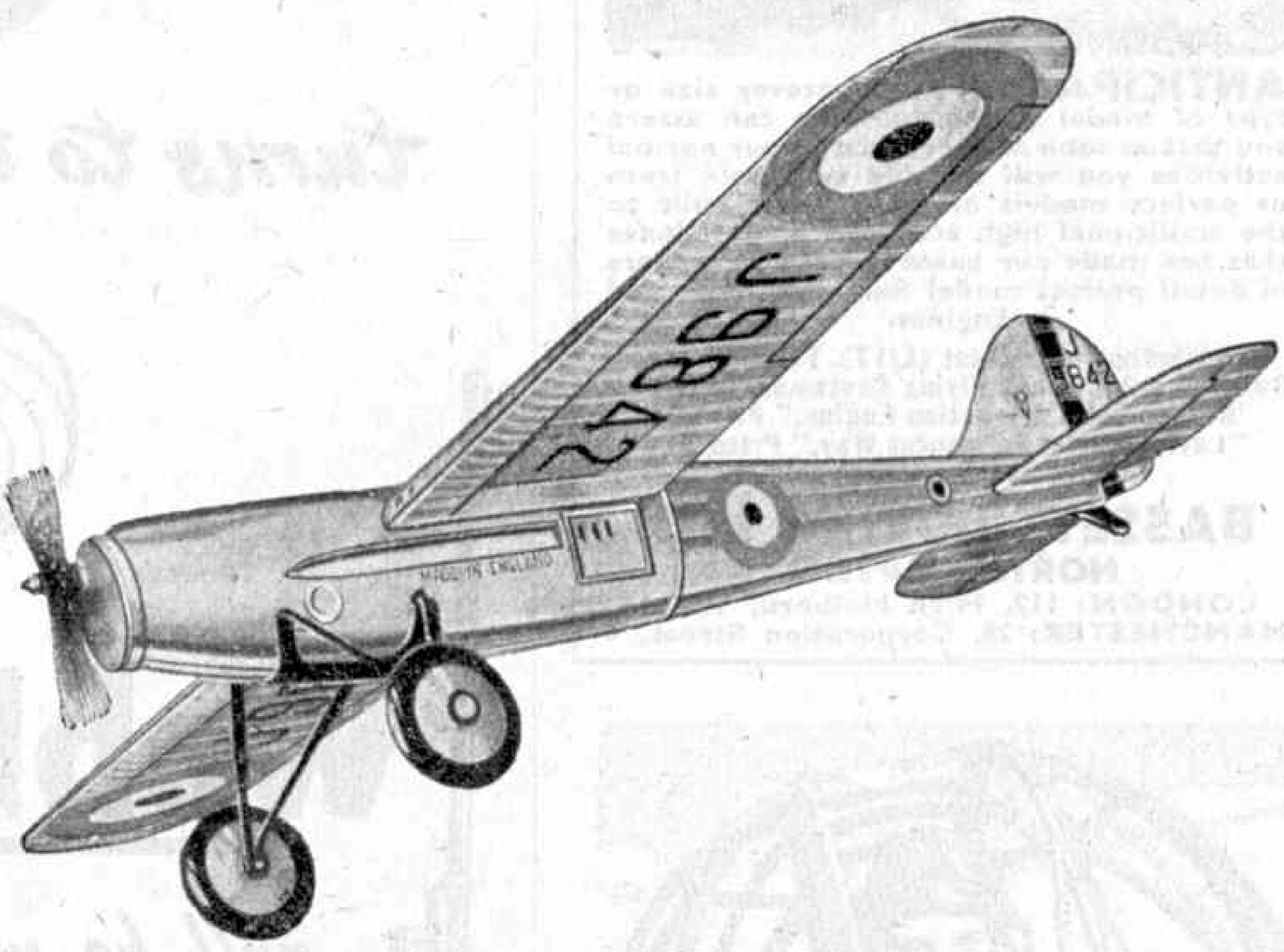

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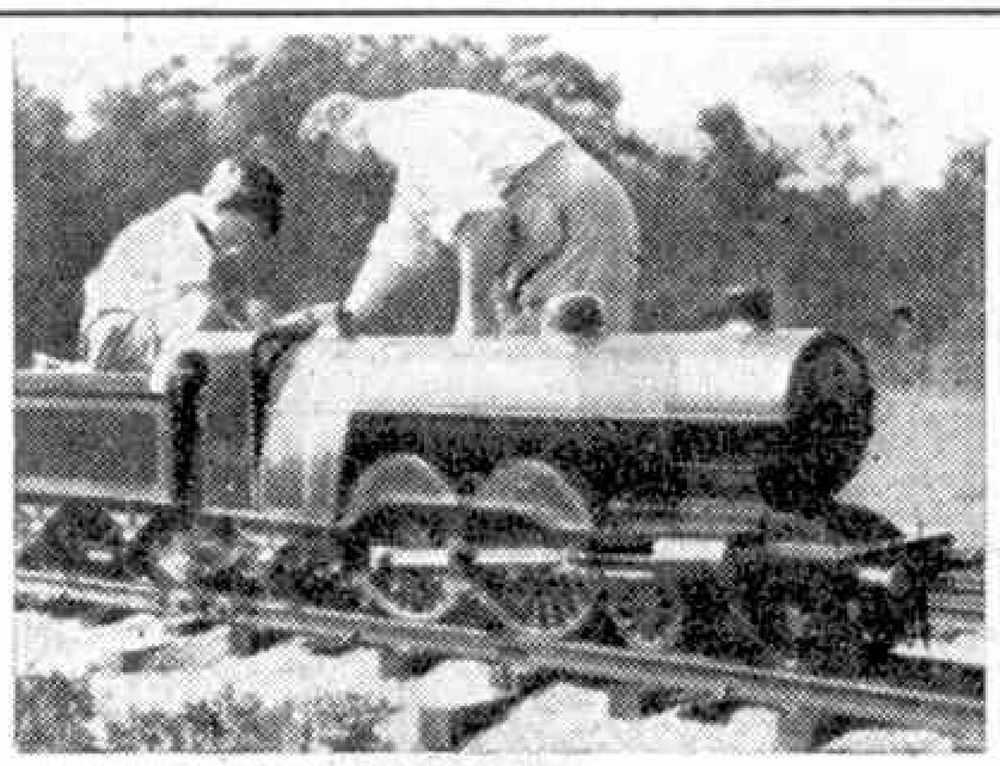

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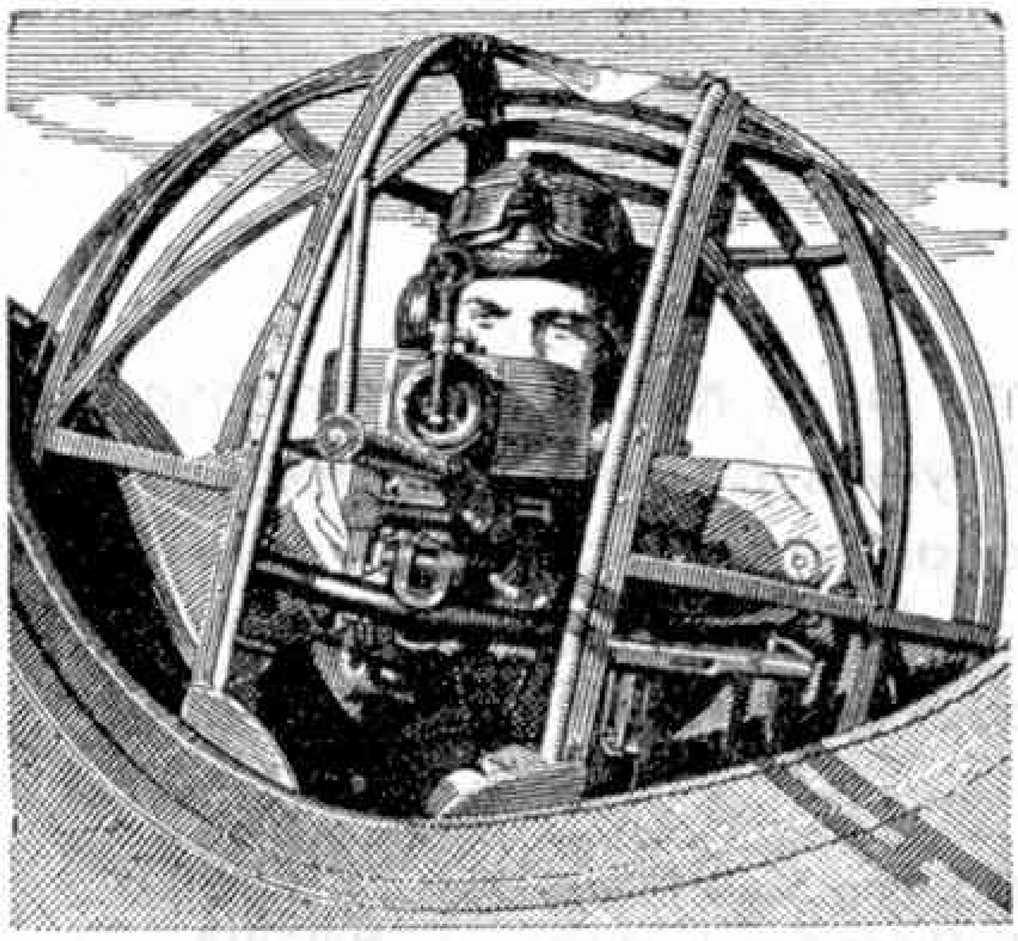

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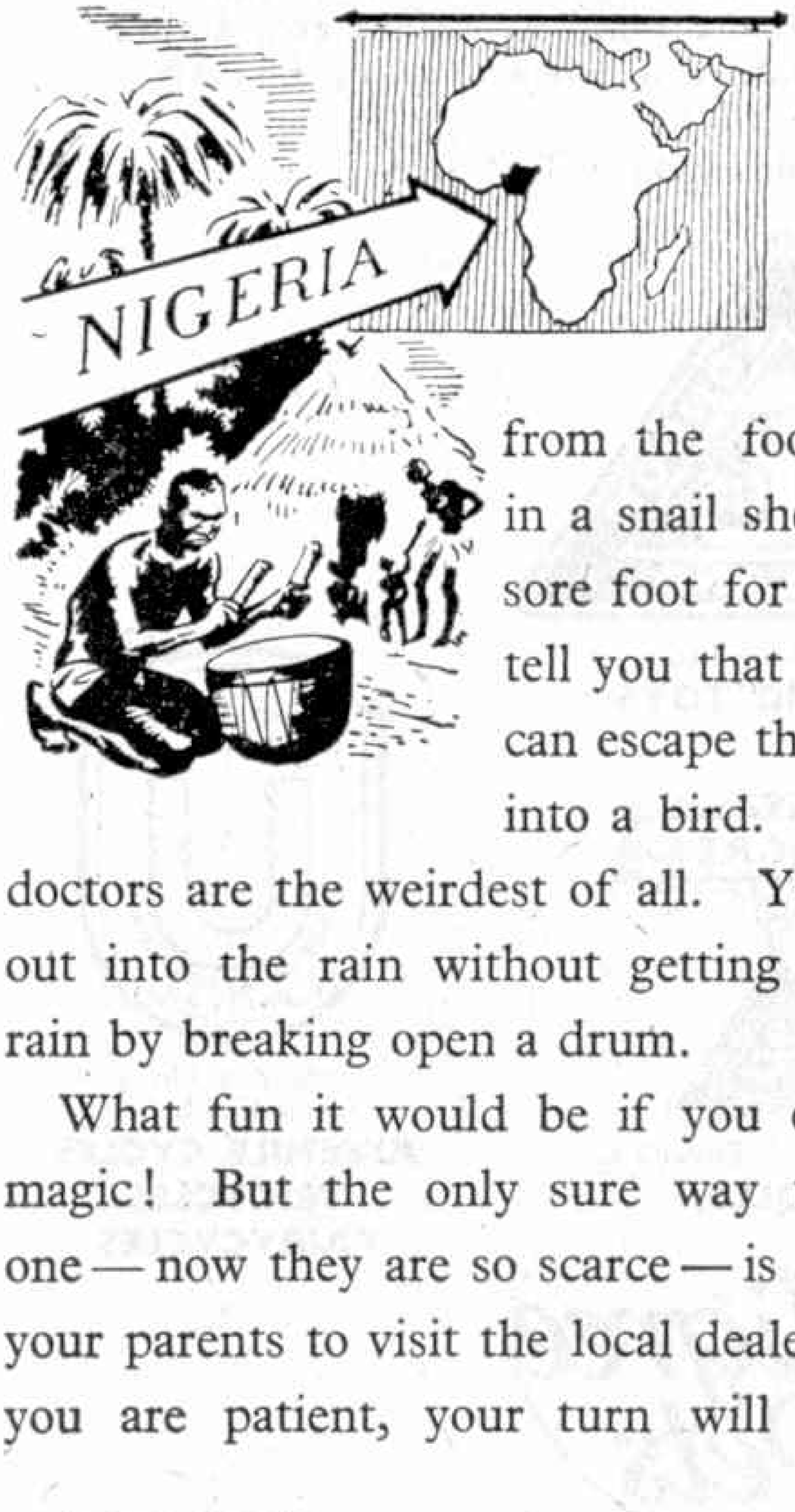

If you were to visit the jungles of Nigeria, in British West Africa, even nowadays, you would hear of very strange customs.

Some of the natives still believe that if they take a little sand from the footprint of an enemy and put it in a snail shell, the enemy will suffer from a sore foot for the rest of his life. Others will tell you that if a hunter gets into danger, he can escape the lion's claws by turning himself into a bird. But the stories about the witch doctors are the weirdest of all. You will be told that they can go out into the rain without getting wet and that they can make it rain by breaking open a drum.

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Next Month: "SALVAGE OF THE 'GEORGIC'." By O. S. Nock

MECCANO MAGAZINE

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May 1945

With the Editor

Our Greatest American Friend

The death of President Roosevelt probably revealed to most of us for the first time how much this great American had meant to us. We had placed him alongside our own Winston Churchill and given him our trust and confidence. I feel that I cannot do better than quote here Mr. Churchill's concluding words in his tribute to Mr. Roosevelt in the House of Commons on 17th April: "For us it remains only to say that in Franklin Roosevelt there died the greatest American friend we have ever known and the greatest champion of freedom who has ever brought help and comfort from the New World to the Old."

Franklin D. Roosevelt

A "Bevin Boy's" Day's Work

To-day a letter has come from a reader who is a "Bevin Boy" engaged in coal mining, Mr. W. A. C. Smith, of Broomhill, Glasgow W.1. He describes his day's work, and I am sure readers will find this interesting.

"I work," he said, "in a pit near Armadale, in West Lothian and live in a hostel there. I am on the day shift—7 a.m. to 2.30 p.m. with a break of 20 minutes at 9.40. To get to the pit I have to travel about five miles from the hostel by bus. Arriving there I enter the pithead baths and change into my working clothes. I then walk leisurely to the lamp cabin and receive my lamp, after giving its number, and then climb the steps to the pithead where the cage is. After descending in the cage we report to the firemen who tell us where to go.

"Recently I have been working at one of the coal faces near the pit bottom. Arriving at the almost straight "run" which leads to the coal face I deposit my jacket, thermos flask and lunch. My job is bringing out a "rake" (usually 10 hutches) of loaded hutches and returning with a "rake" of empties.

"I sit waiting for 10 loaded ones to collect. They are brought out singly the short distance from the coal face, and after seeing that they are coupled up, I attach the cable, which is run off a haulage motor, and signal to the motor man to start the haulage. I follow behind the "rake" and when it reaches the end of the "run" the haulage is stopped. From here the hutches are taken singly up a steep incline by a different type of haulage. By this time 10 empties will have collected and, taking the cable from the loaded "rake," I attach it to the empties and signal the haulage to start. Following these in, I go through the same performance all over again. Of course everything does not go smoothly every time. Often the leading hutch in the loaded "rake" will leave the track and the result is a glorious smash!"

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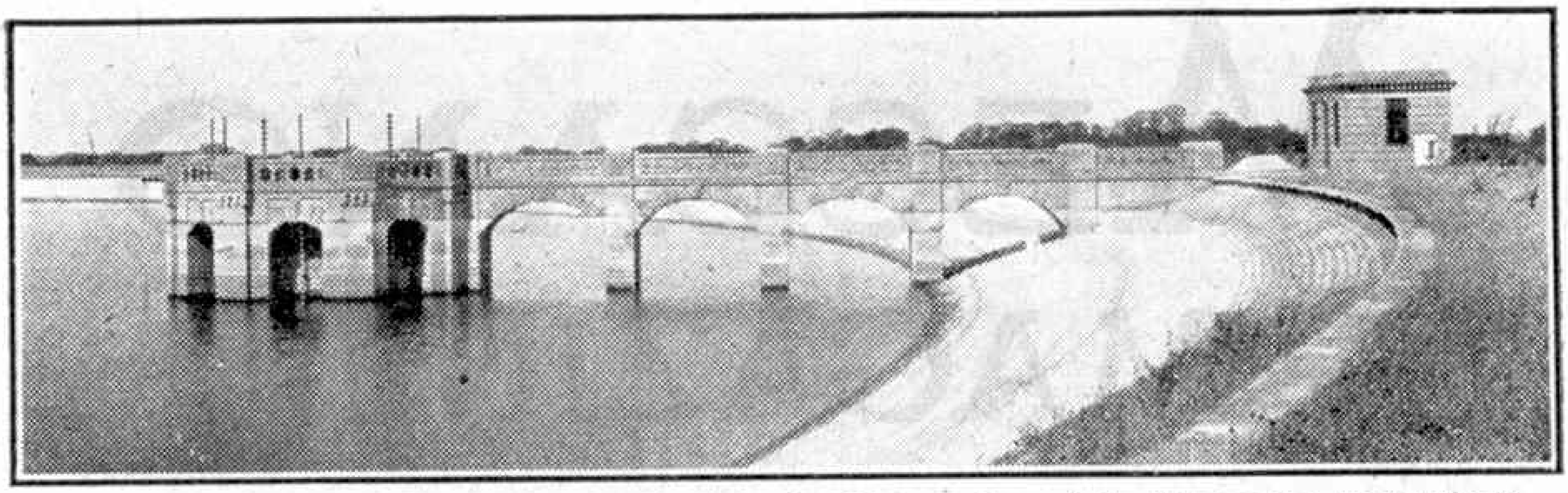


A reservoir outlet tower. Our photographs are reproduced by courtesy of the Metropolitan Water Board.

How London Gets Water

The Construction of a Great Reservoir

By H. F. Howson

CAN the reader imagine three huge tanks, each as large as Trafalgar Square, and as high as Nelson's Monument, filled to the brim with water? If these provided London's sole water supply, they would be emptied every day of the year!

As London has expanded, so has her need for water grown correspondingly. The Metropolitan Water Board, which governs London's supply, has met this need by drawing increasingly upon the River Thames, and making use of the low-lying, water-bearing meadows by the riverside for the construction of great storage reservoirs. The River Thames of course is unable to furnish all that is needed. There are other sources of supply, notably the River Lee, feeding the great King George Reservoir near Chingford, and various springs and wells in other environs of London. In size and importance, however, the Thames group of reservoirs comes first, as they provide 70 per cent. of London's total storage, and include the largest of all the reservoirs, the Littleton, near Staines, which holds $6\frac{3}{4}$ thousand million gallons of water.

Why are these huge reservoirs necessary, one may ask, when the Rivers Thames and Lee, not to mention scores of springs and deep borings, seem always to be in constant flow? Could not water be pumped direct from these sources through filters to the consumer? The answer is that London's demands must be met at all seasons of the year. During winter floods there is undoubtedly more than enough to meet the demand. The reservoirs' main function is to store this surplus and release it during the dry season, or in other words to provide for rainless days. In addition, the water taken from reservoirs after storage is purer than when it entered. Microbes that can thrive in river water die when that water is stored in a reservoir for a few days. An instance of this purification is that bacteria survive the leap over Niagara Falls, but disappear after a short time in the less disturbed waters of Lake Ontario.

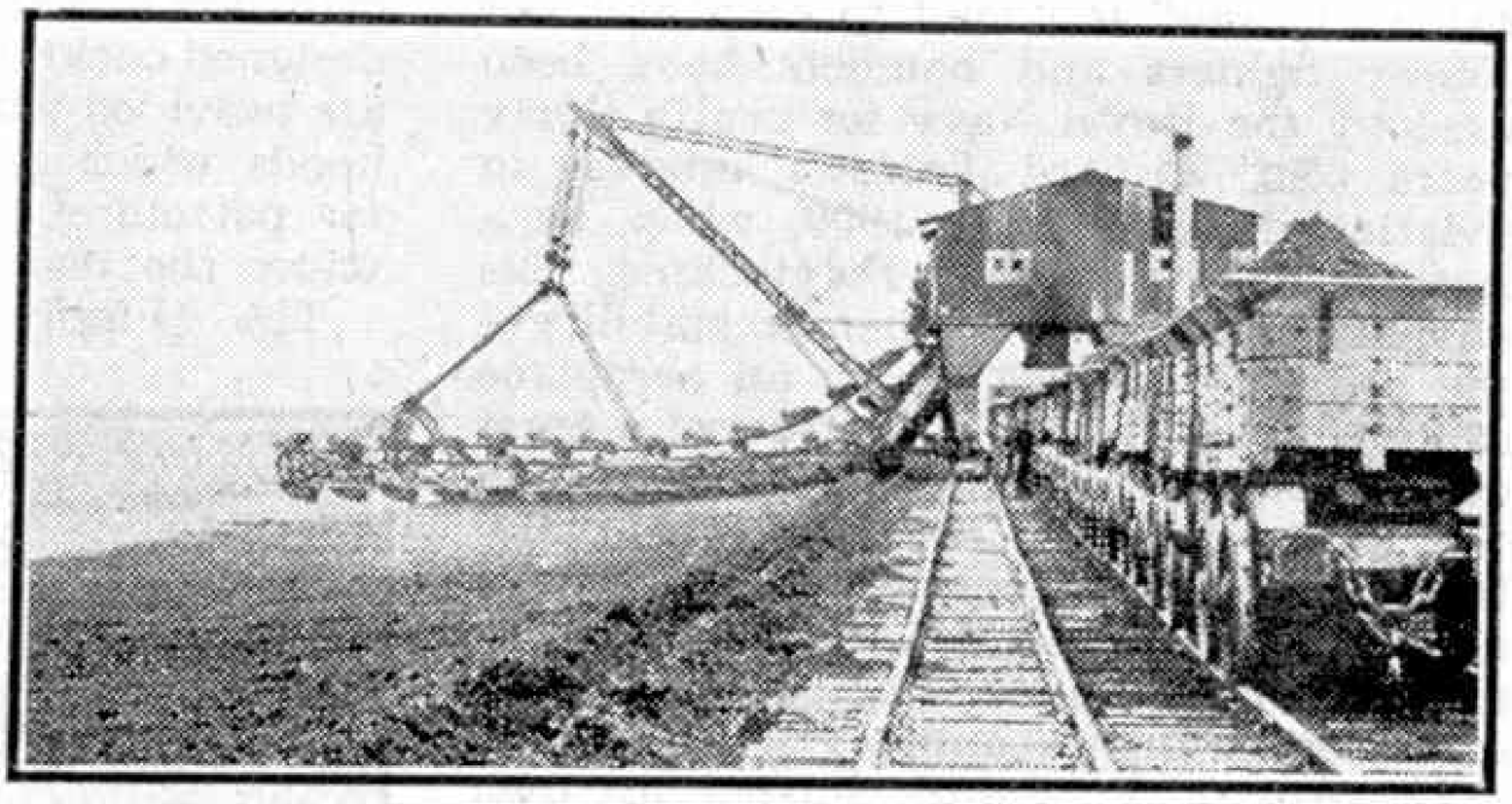
A brief description of the Littleton Reservoir may help the reader to form some idea of the vast work of the Metropolitan Water Board as a whole. This reservoir is a veritable inland sea, with colossal shores, constructed wholly by man. The site was once green fields, bordered on one side by the village of Littleton. The fields disappeared, as did some cottages and the Littleton Post Office, and water 38 ft. in depth now covers the area. Thick London clay lies beneath these fields and forms an ideal watertight bottom to the reservoir. Thus no undue difficulties were met with in preventing leakage here.

To build watertight retaining walls for this huge volume of water, however, was a different story. Clay again was decided upon as the medium. A great trench was excavated around the site, penetrating through subsoil to reach 3 ft. into the firm London clay, which was met with at depths varying from 12 to 55 ft. Then a wall of puddled clay 7 ft. in width was keyed in and built up to a height of more than 30 ft. above ground level.

This clay core was enclosed by 6 ft. of rammed material on each side, and then soil and gravel scraped from the bottom of the reservoir were added to the base to form sloping sides. The whole wall, when faced to the outside with grassed loam and on the inner side with concrete blocks, measured 224 ft. at the base, tapering to 24 ft. at the top, and when completed was nearly four miles in length! Truly an immense undertaking.

The surface area of water enclosed was so great as to render necessary the construction of a breakwater embankment almost from side to side of the reservoir to prevent wave action from smashing the outer embankment. Water enters the intake channel from the Thames, passing through Venturi meters that record the quantity admitted, and is then pumped over the embankment through four great steel mains which descend into an inner basin. The flow over the weir edging this basin is an impressive spectacle when the pumps are in normal action.

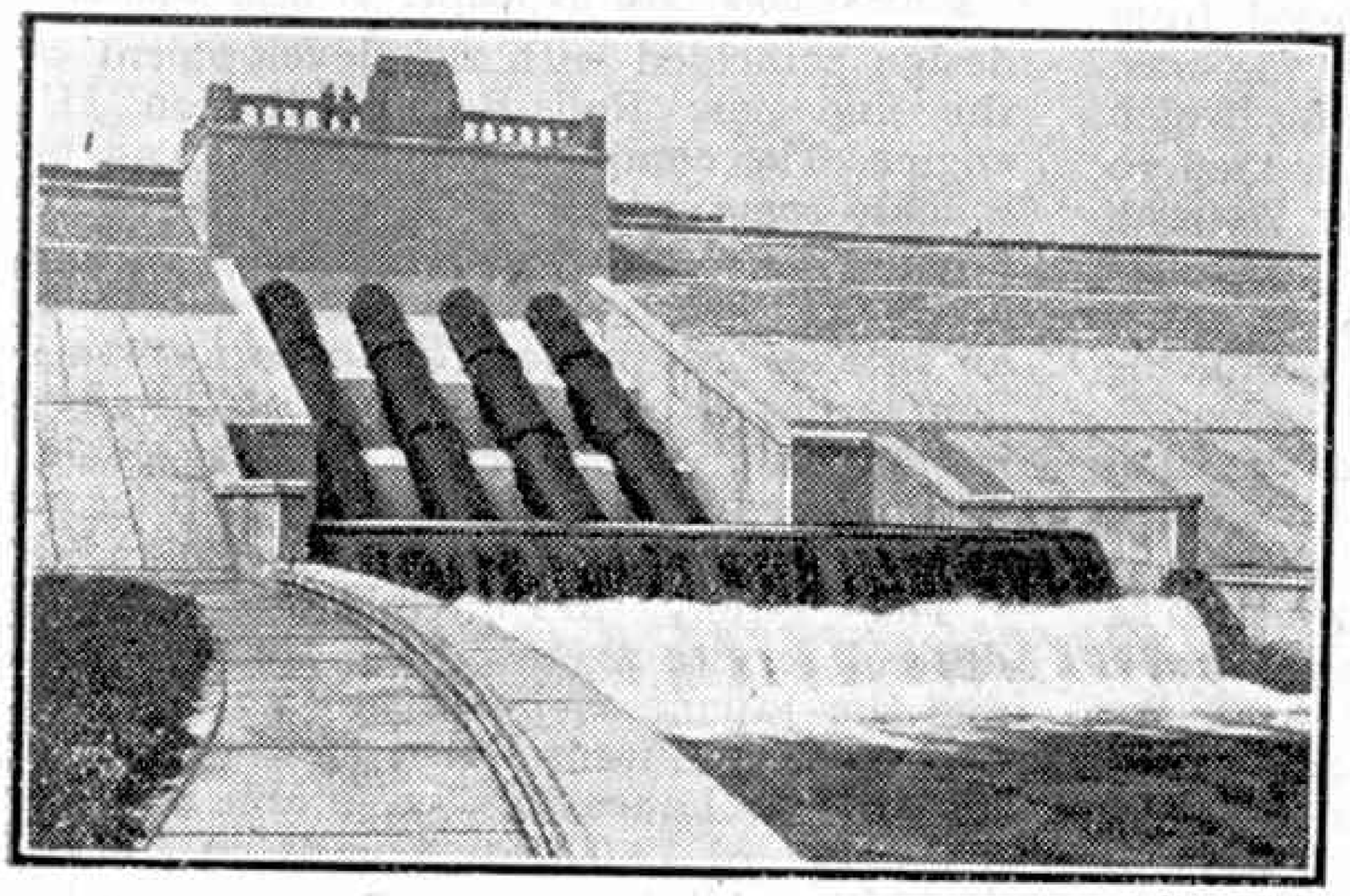
The reservoir outlet is the tower illustrated on the opposite page, to which the water obtains access by means of seven built-in sluices. From the tower it flows down a shaft and through a 10-ft. tunnel beneath the embankment to a further shaft on the outside of the puddled clay core. Thence the water is conveyed partly by the existing Staines aqueduct, and partly by a conduit, to the Kempton Park and Hampton filter works and pumping stations a few miles away. There the water is partially purified by allowing it to filter slowly through beds of sand. Chlorination and other chemical processes follow, and finally pure water issues, suitable for human consumption. It is then pumped in uphill stages through miles of mains to smaller covered reservoirs serving large areas of North and West London.



This giant excavator, used in the construction of a great reservoir, removed 1,250 cu. yds. of soil daily.

The pumping station built to feed the Littleton Reservoir contains four 48-in. centrifugal pumps, which lift the water from the Thames over the embankment. The pumps are driven by four single-cylinder horizontal steam engines of 583 h.p. each, which in turn derive their power from boilers fed by coal from overhead hopper bunkers. The actual stoking is mechanical on the chain-grate principle. No pumping is necessary at the reservoir outlet, for the water flows by gravitation to the filter works. The task of constructing this reservoir occupied several years, although a great deal of massive machinery was employed in excavating and dredging, and it is not surprising to learn that at one time 2,000 workmen were employed.

In this short article it has only been possible to describe one particular reservoir and its functions, without alluding in detail to the Board's other immense undertakings.



The inlet pipes from a pumping station to a large reservoir.

Fairey "Firefly"

By John W. R. Taylor

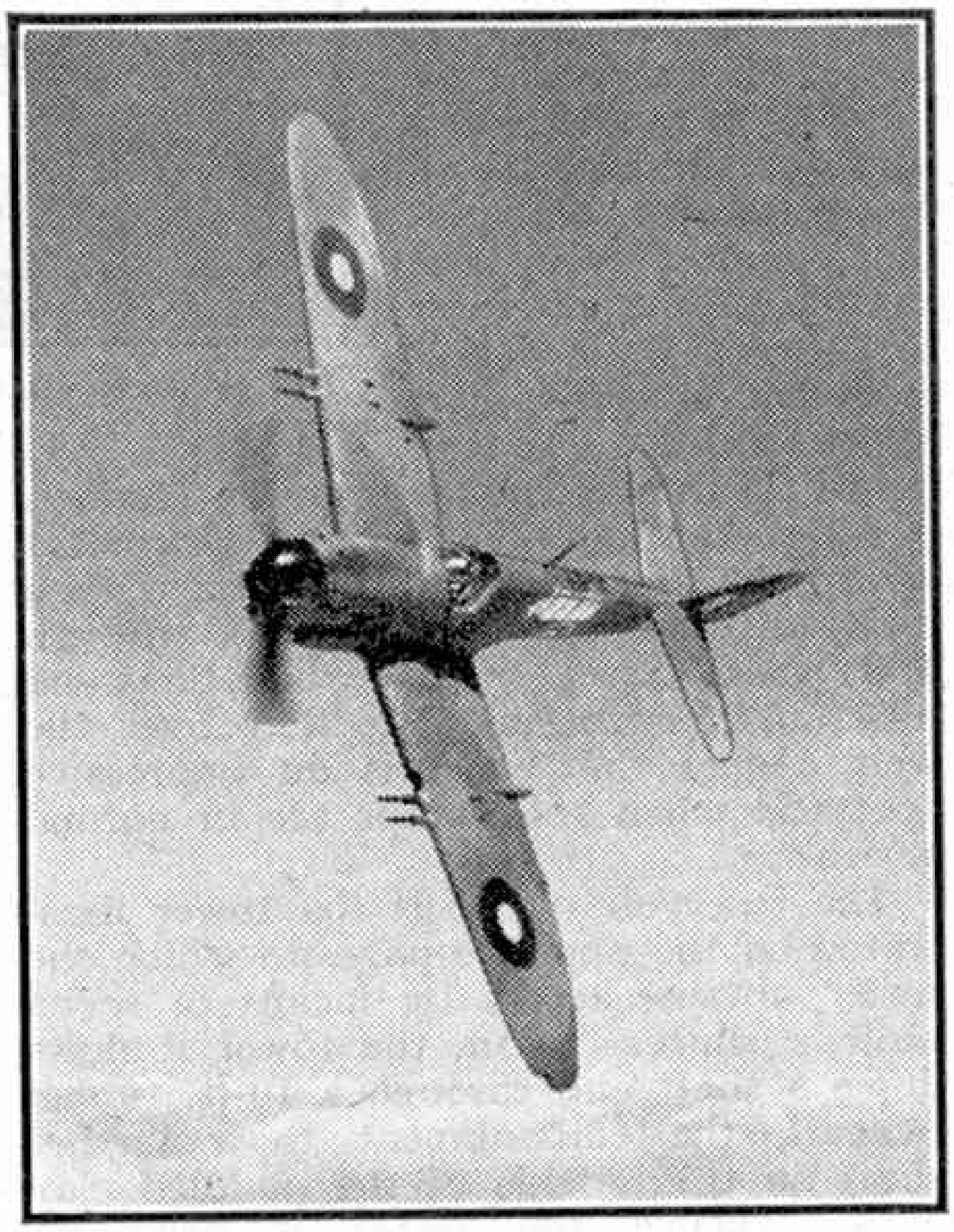
WHENEVER British naval flying is being discussed, sooner or later the name "Fairey" is bound to crop up. For Fairey fighters and bombers have been used by the Royal Navy for nearly thirty years. Sir Richard Fairey's interest in aviation dates back to 1909, when, as a lecturer at Finchley Polytechnic, his advanced theories on inherent stability—the property without which an aeroplane cannot fly satisfactorily—attracted a great deal of attention. After a time he joined the staff of Short Brothers, eventually becoming works manager. This experience no doubt stimulated his interest in naval aircraft, for Shorts manufactured almost all of the early British military seaplanes.

In 1915 C. R. Fairey started his own aircraft company, and his "Campania" seaplanes were soon doing good work with the Royal Naval Air Service. The later IIIF, "Flycatcher," "Fox" and "Firefly" biplanes all marked a definite step forward in the evolution of British warplanes and, in this war, the Fairey "Swordfish," "Fulmar," "Albacore" and "Barracuda" have built up an enviable record of successes in action. Now a new Fairey fighter is in service. Named "Firefly," this sleek two-seat low wing monoplane is the first specially-designed cannon-armed British fleet fighter.

The "Firefly" bears a distinct family likeness to the "Fulmar," but is a much more formidable fighter. A comparison of the two would be unfair, however, as the "Fulmar" was designed as a light bomber and was adapted as a fighter only to fill a gap until fighters ordered from America were delivered early in the war. The "Firefly" has an elliptical wing, which brings it into line with most other modern fighters, and is armed with four 20 mm. Hispano cannon. The wing-form has many aerodynamic advantages to offer, but, until Vickers got down to producing "Spitfire" wings, offered just as many disadvantages from the point of view of production. The wings can be folded manually in a few seconds, with the result that the "Firefly" can be stowed in a space no wider than its height—a creditable achievement. The Youngman flaps, similar to those on the "Barracuda," are in this case fully retractable and according to one airman make the "Firefly" "the answer to the naval pilot's prayer" for landing and take-off on small flight-decks.

The fuselage and tail unit are quite orthodox structures. The roomy and well-designed cockpits for the pilot and observer are provided with large jettisonable sliding hoods which give a good all-round view for patrolling. An arrester hook is fitted under the rear portion of the fuselage.

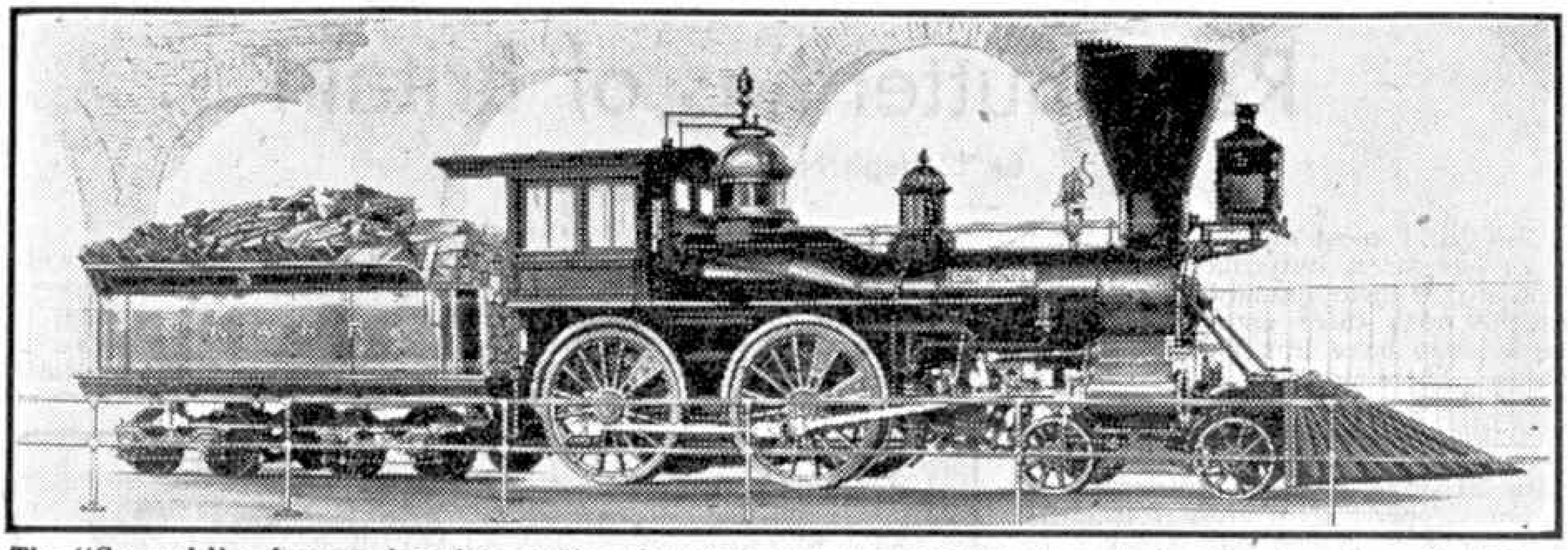
The "Firefly" is fortunate in that its



Banking steeply a Fairey "Firefly" shows off its graceful lines—and its sinister 20 mm. cannon.

design coincided with the development of the fine new Rolls-Royce "Griffon II" engine. The complete power plant can be quickly removed for replacement or maintenance, without removing any of the accessories such as the lower cowling, air intakes and radiator. No performance figures may be quoted yet, but the "Firefly" is probably the world's fastest single-engined two-seat fighter. And yet it has an exceptionally long range at cruising speed.

The "Firefly" has already seen a great deal of service against both the Germans and the Japanese. For instance, it was as a result of "Firefly" reconnaissance that a force of "Lancasters" was able to drop a number of 12,000 lb. bombs on the ill-fated *"Tirpitz."*



The "General," a famous American engine that took part in a historic chase during the American Civil War. Photograph by courtesy of the Nashville, Chattanooga and St. Louis Railway.

A Famous Railway Chase

THE old woodburner shown in the illustration at the head of this page is the "*General*," the central figure in an exciting railway story of the American Civil War. At the time she was in the service of the Western and Atlantic Railroad, and on an April day in 1862 she left Atlanta, the capital of Georgia, for Chattanooga, at the head of a passenger train, with three empty freight cars next to the engine. The train stopped at a station called Big Shanty so that the passengers and crew could have breakfast at a house about 40 ft. from the track. Captain Fuller, the Confederate officer in charge of the train, sat where he could watch it through a window and was startled to see a group of strangers climb suddenly on the engine, full of excitement, and set off rapidly with only the three empty freight cars behind them.

At first Fuller thought that the train had been seized by deserters from a Confederate camp in the neighbourhood, and he rushed out with the engineer of the train and the foreman of the railway company's shops, with the fixed determination to recapture the engine. The start was not very promising, for the three were on foot and alone, but they went on, to learn at the next station, two miles away, that the fugitives had stopped there to take all the tools they could find and that they had cut the telegraph wires.

Fuller now realised that the men who had stolen the engine were Federal raiders in disguise. He managed to find a hand car, with which the three men continued the pursuit, two at a time running and pushing while the third rested. Their hope was to find an old engine, "*Yonah*," at an ironworks along the line, and on they went, stopping from time to time to clear the track of obstructions that had been placed on them. They were delighted to find the old engine ready for instant use. A coal car was attached, half a dozen Confederate soldiers joined the party, and the pursuers now raced on at 60 m.p.h.

Kingston was the first large centre reached and there they found that the Federals had claimed to be rushing ammunition for Confederate forces to the north, and in that way had been able to pursuade the railway authorities to give them a clear run through. The pursuing train on the other hand was hemmed in by heavy freight trains, and Fuller abandoned it, taking up the chase again in another engine, with one car attached to it, that was standing at the far end of the station. Then he found sleepers on the track every 200 yards or so, pushed out from their rear car by the Federals. He lost time in removing these and the chase began to look hopeless when he found the track torn up for 60 yards, but he set out on foot with only one man following him. After running two miles he stopped a train coming in the opposite direction, jumped on it and started it backward. The whole train continued in this way until a siding was reached, and there the cars were pushed out of the way and the pursuit was continued with the engine alone.

One exciting incident after another followed quickly. So far the pursuit had been undertaken blindly, but now, two miles beyond Dalton, the fugitives were sighted. They immediately detached one of their three freight cars, hoping to cause a disastrous collision for their pursuers, but Fuller coupled on the car without stopping and himself rode on top of it so that he could give directions to the driver of his engine, who now could see nothing ahead of him. A second car was picked up in the same way and the two were pushed off at the first convenient siding. Then a rail was discovered on the track. It was too late to stop, but the engine went right over the obstruction at 55 m.p.h. without mishap.

More obstructions were dealt with, and two miles farther along the fugitives were again brought in sight, tearing up the track in plain view of a Confederate regiment in camp near by. Now came the most exciting part of the entire chase. The "*General*" and Fuller's engine "*Texas*" were both being driven all out, and probably were running faster than any engines with wheels of only 5 ft. 10 in. diameter had ever done before. For 18 miles the wild rush continued, with "*Texas*" gaining. As a last resource the Federals set their only remaining freight car on fire, with the idea of leaving it on the next bridge, and then they abandoned the engine and took to the woods. Captain Fuller coupled on the burning car, extinguished the fire and went back along the track to Ringgold, where Confederate militia were given horses and sent out in pursuit of the fugitives.

So ended this amazing railway chase. When the "*General*" was abandoned, oil cans, tool boxes and planks ripped off the freight car were being burned to keep her going. In the end she was put in reverse in order to bring on a collision with the pursuing engine, but in their haste and excitement the Federals left the brake on the tender, and there was insufficient steam to back the engine against its resistance.

This was not the end of the "*General's*" adventures in the Civil War. She came under fire again two years later when taking ammunition up to the Confederate lines and bringing back wounded. When eventually the Federals entered Atlanta it was thought that the old engine would have to be left behind, but she was got out at the last moment and went southward with a train load of refugees and war material. Now she stands, an honoured veteran, in the Union Station at Chattanooga.

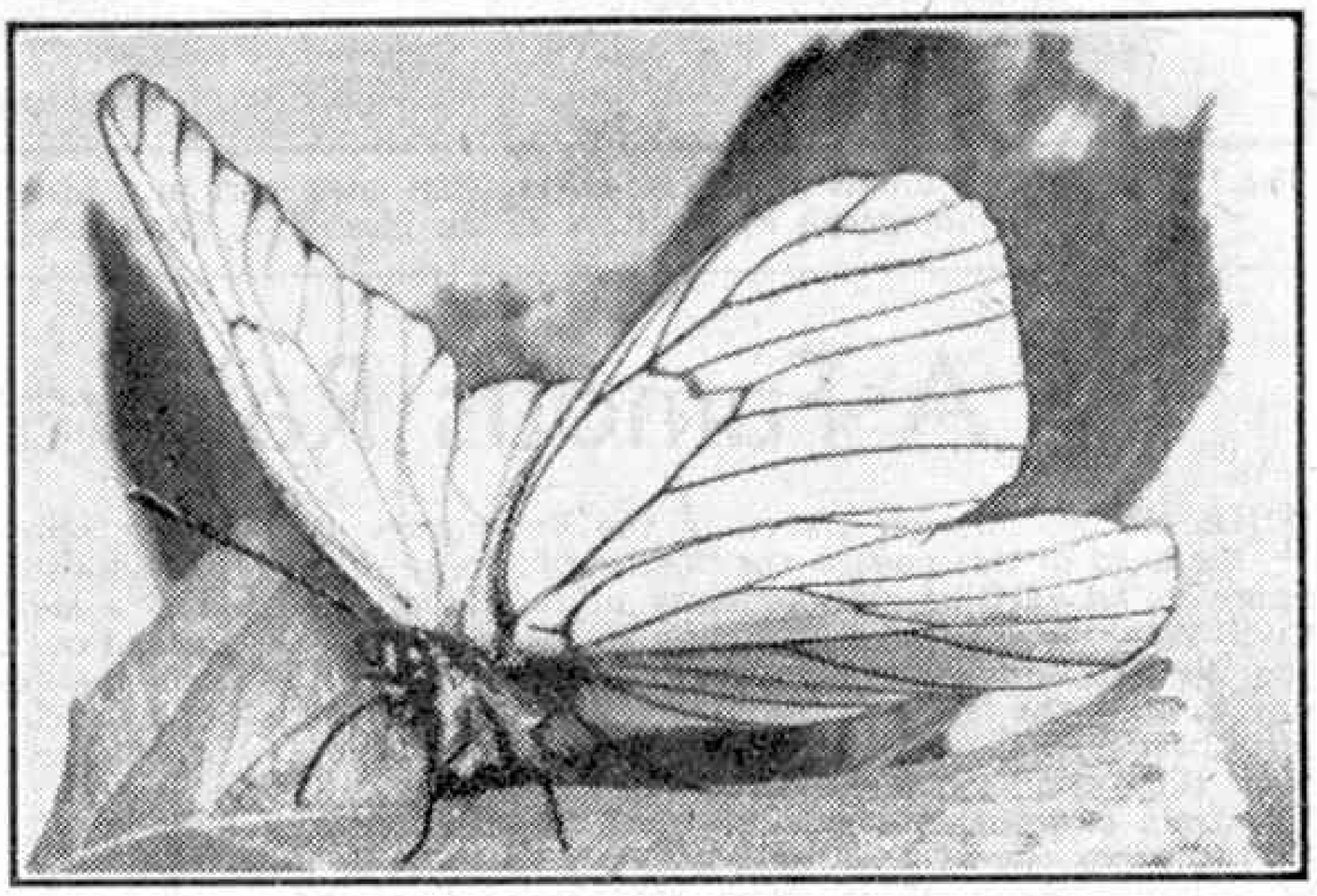
Rare Butterflies of Britain

By L. Hugh Newman, F.R.E.S.

I EXPECT most of you know the names of some of our rarest butterflies, even if you have never seen any of them actually alive. They can be divided roughly into three groups. First of all there are those that have apparently disappeared from our fauna. There are only three of these—the famous Large Copper, the Black-veined White and the Mazarine Blue. Many explanations are given for the disappearance of that glorious butterfly the Large Copper. It is over 100 years now since it graced our fenlands in numbers, and some naturalists will tell you that it was the progressive draining of these tracts of land that was responsible for the extermination of the species. If you read the written labels pinned under specimens in museums and old private collections, however, you will find that they ceased to haunt these districts some years before work on the fens commenced. I think the probable explanation is that the parasitic ichneumon fly that preys on the caterpillars of this family got the upper hand, and overwhelmed the small stocks in their very restricted breeding quarters.

The mystery of the Black-veined White makes a more interesting story. Between 70 and 80 years ago this curious butterfly with black-veined semi-transparent wings was common in the New Forest, that Mecca of all entomologists, but soon after this it rapidly began to die out. Its last stronghold was known to be in certain parts of Kent round about Canterbury, but just before the outbreak in 1914 of the last great war it disappeared entirely. The theory is that to maintain itself in this country this butterfly was dependent on fresh stocks being introduced every year in the form of eggs laid on the twigs of fruit tree stocks imported from the Continent. When our own research stations such as East Malling in Kent began to raise fruit tree stocks in this country the need to import them died out, and so no more Black-veined Whites were brought into the country in this way.

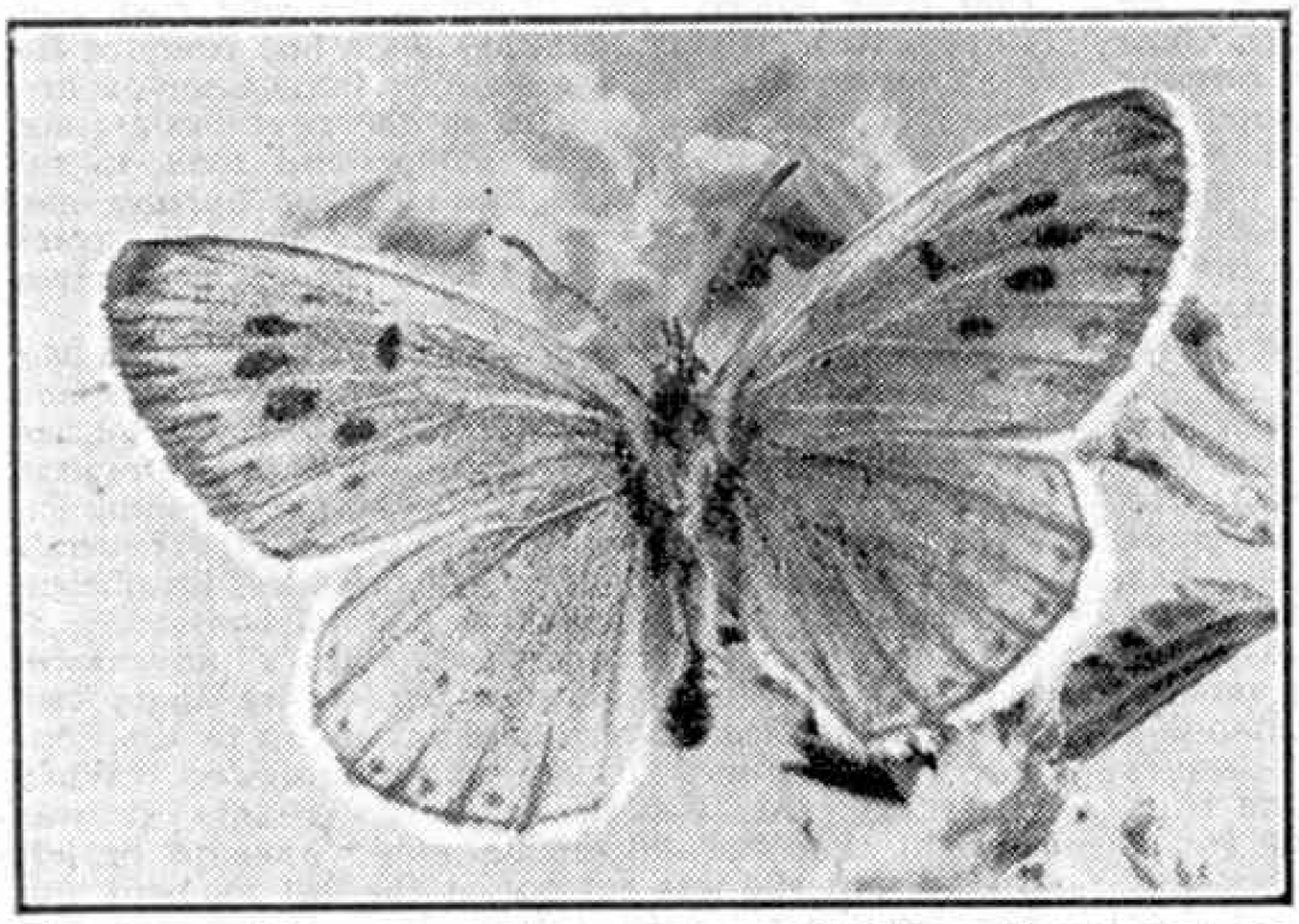
It is possible that the Mazarine Blue still breeds in remote country districts, such as the wilder parts of Wales, where collectors who would recognise it seldom venture. Considerable excitement was caused a few years ago when a well-known entomologist found a Mazarine Blue in a row of Common Blues in a schoolboy's collection. On being questioned the boy said he had taken all of them in the Cheddar Gorge while on holiday in Somerset. I took part in an extensive search of this district, and in a sheltered part of the gorge I found the food plant of the caterpillars, one of the rarer vetches, but no sign of the butterflies!



The Black Veined White, a butterfly that has not been seen alive in Great Britain for more than 25 years.

In the second group come the rare and local butterflies. These include such favourites as the Purple Emperor, Swallowtail, Large Blue, Black Hairstreak and Chequered Skipper. The reason why the Purple Emperor remains so rare is quite simple. Its caterpillars hibernate all winter in the forks of sallow bushes exposed to hunting birds, which soon learn to find them, and by the spring very few are left to carry on the race in the forests where they breed. The best one can hope for is to see one or two of these majestic butterflies, the regal Purple Emperors, circling round their "throne," which is the tallest oak tree in the vicinity. Some books inform you that the entrails of a rabbit placed at the foot of the tree will entice them to the ground, but personally I have found a double sheet of newspaper spread out in an open clearing is a far better "bait," as these large butterflies are notoriously inquisitive and will always come down to inspect anything unusual.

The breeding quarters of the gorgeous Swallowtail are confined to the Norfolk Broads and the closely preserved sanctuary of Wicken Fen. The only way you could hope to see them in any number is to take a yachting holiday on the Broads in early June, when the



The Large Blue seems doomed to extinction. It can now be found in few districts.

The Chequered Skipper, a rarity that haunts the woodland ridings in one or two counties only.

butterfly is on the wing. The Large Blue is far more difficult to track down, as it has now completely disappeared from its last well-known locality, at Millhook in North Cornwall. But I have memories of a holiday early in the war, halcyon days by the blue sea, watching these lovely white-fringed butterflies flitting between the stunted gorse bushes and over the rounded ant hills carpeted with purple thyme. Yes, the Large Blue does still occur in considerable numbers, but it will need protection after the war if it is not to go the way of the Large Copper.

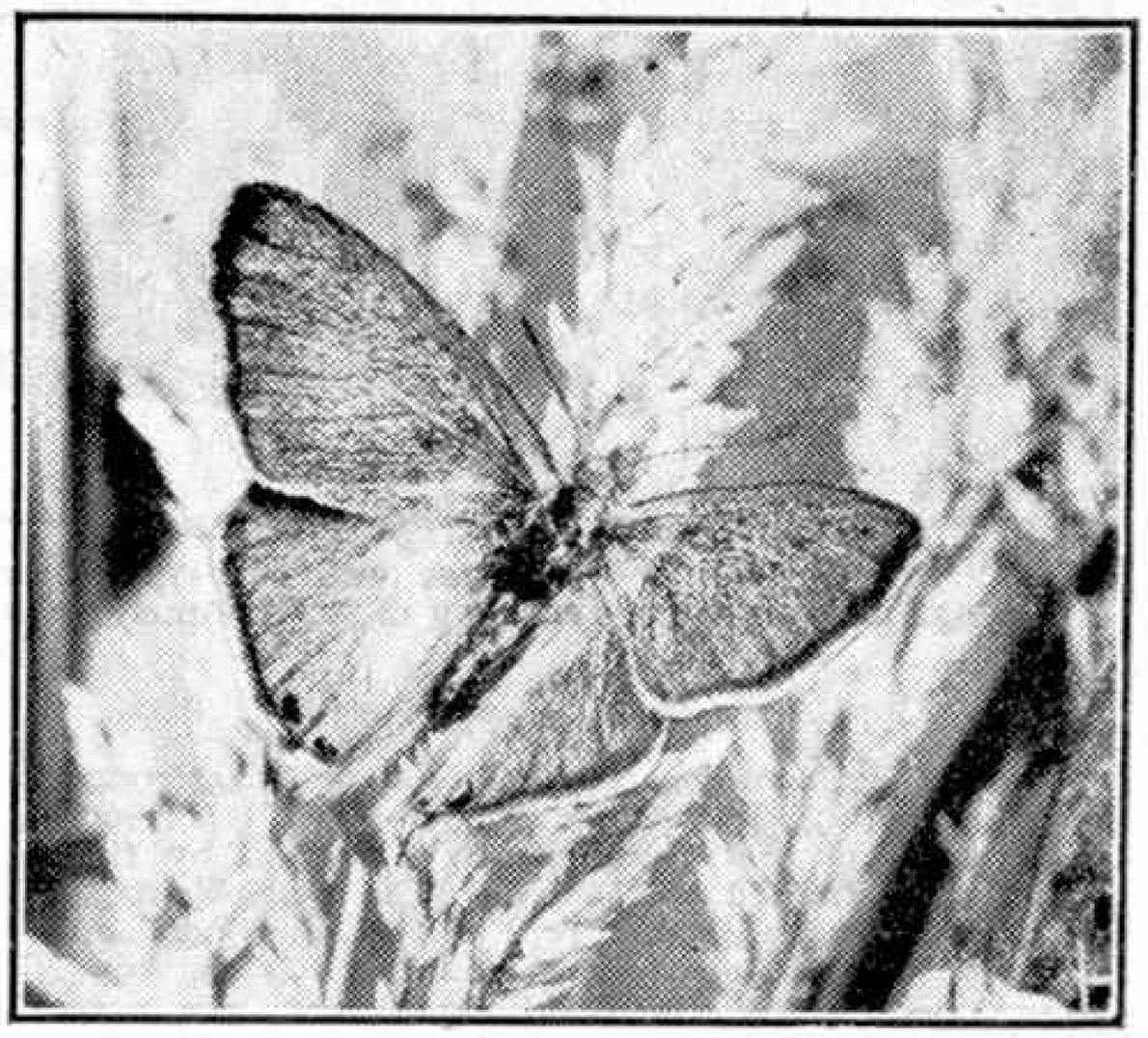
Among the Skippers, that curious family of butterflies that some people think form the link between butterflies and moths, only the Chequered Skipper can be considered rare, confined as it is to one or two Midland counties, where it haunts lonely woodland ridings. The Hairstreaks, attractively named after their colouring, Green, Brown, Purple, White-Letter and Black, are all widely distributed throughout the British Isles except the last-named one, which as far as I know occurs in numbers only in certain wooded districts in Huntingdonshire. Two others might be mentioned in this group. The Small Mountain Ringlet only seems rare because it occurs on the grassy uplands in mountainous districts in Northern England and Scotland, where few people have the time or energy to seek it out. The Large Heath comes in somewhat the same class. It frequents mosses and tracts of bogland that are definitely known to be dangerous, and even if you are accompanied by an expert guide the chances are that the butterflies you want will not be flying along the safe and recognised pathways!

I always think the butterflies that come to this country from abroad are the most exciting to look for. I mean the migrants, which form the third group. You will know the names of some of them for certain, such as the Camberwell Beauty, the Bath White, the Queen of Spain Fritillary, the Pale Clouded Yellow and the Long and the Short-tailed Blues. I have seen flocks of Camberwell Beauties fluttering in the open clearings of a pine forest in Southern Finland. Now and then one would come and settle upon my arm, seeking moisture, while others would alight on the tall trunks that in places oozed resin. But only once have I seen one in England. I had just been given my first bicycle, and one sunny autumn morning I was out for a spin when I caught sight of one of these striking butterflies, basking with wings wide open on an imposing white gatepost. I was not too young to recognise it immediately, with its purplish-brown wings deeply edged with pale yellow and a row of little blue pearl spots. In my excitement to turn round quickly to rush home for my net and boxes, I fell off my machine, but alas, a scar on my knee is all I have to show, as upon my breathless return the Beauty had fled.

I suppose the Queen of Spain Fritillary is the most lovely of all migrant butterflies. She is a very regal lady. The undersides of her wings are studded all over with silver and her upperside colouring is deep golden brown, speckled with black. The only time I ever saw one alive was in the Channel Isles. I was staying on Sark, and had joined a bathing party, and as we made our way down to the shore my friends asked me to point out to them the various kinds of butterflies that were fluttering about in the valley. Most of them were quite common, but suddenly I saw one I did not recognise at once. "Fancy seeing a butterfly you don't know," laughed my friends. "Give me a chance," I shouted back, as I chased down the hill as fast as I could. Well, eventually the strange butterfly did settle, but on the other side of a wide boggy stream. However, I managed to get near enough to see what it was and, as you probably have guessed, it was "Her Majesty" the Queen of Spain Fritillary.

You may well ask what chance have you of ever seeing this rare butterfly alive? Well, one may turn up anywhere. For instance, in the autumn of 1943 a boy at the Bluecoat School at Horsham in Sussex, caught two Queen of Spain Fritillaries that had just emerged from their chrysalides by the verges of the school rugger field. Obviously a female of this species must have crossed the Channel from France in the Spring, and laid some eggs in this district while flying north.

The Bath White has been named after a beautiful embroidered sampler found in the City of Bath. One likes to imagine that some industrious and artistic lady, with an eye (*Continued on page 178*)



A fragile little migrant that has several times been seen in Great Britain. It is the Long Tailed Blue.

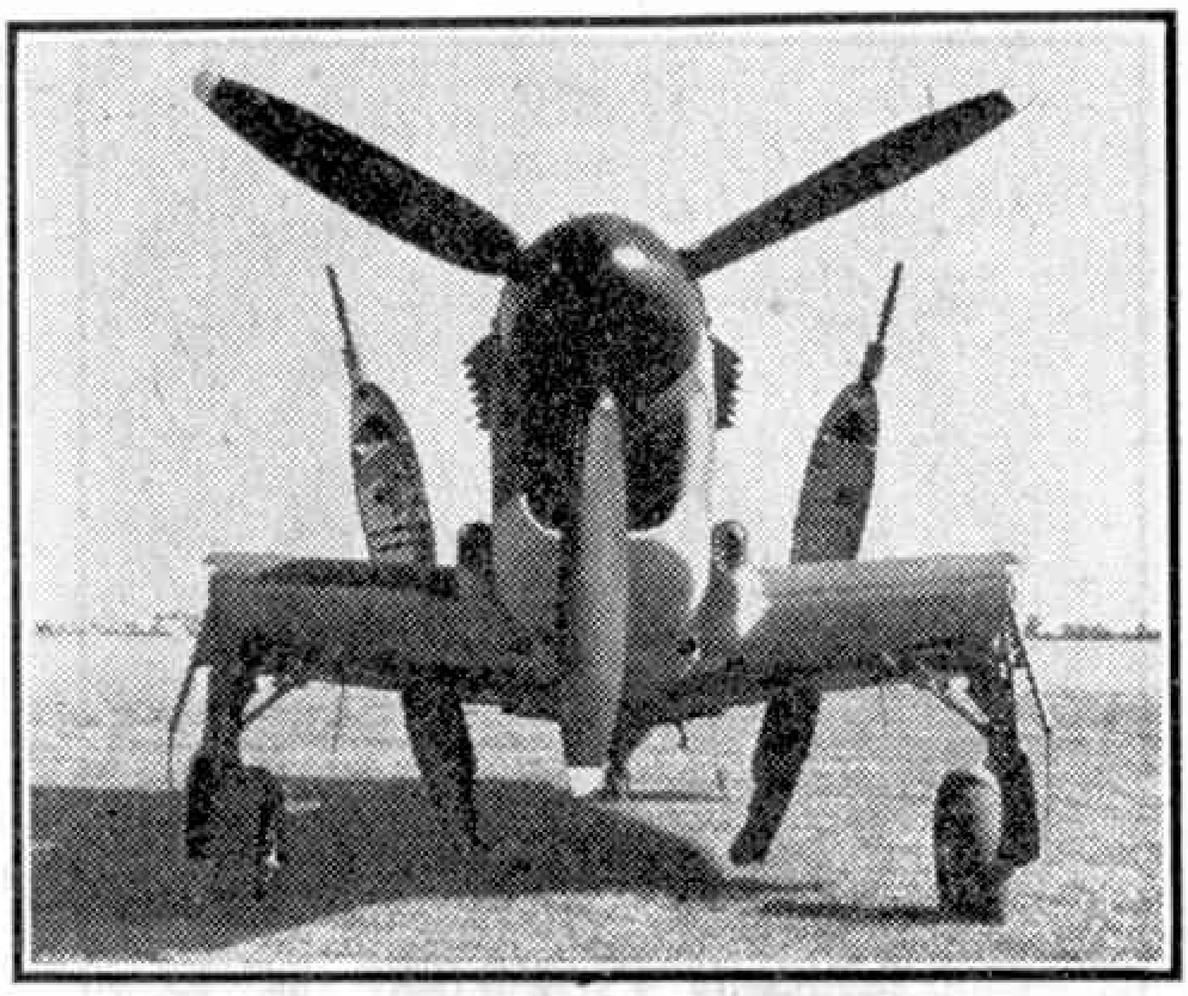
Air News

Australian-Built "Mustangs"

The North American "Mustang" single-seat fighter is being built in Australia, under license, by the Commonwealth Aircraft Corporation, of Melbourne. First of all full detailed drawings and engineering photographs were delivered from America, together with component parts and sub-assemblies sufficient to build several "Mustangs." In addition complete sets of some of the more complicated components and accessories were sent along to prevent a bottle-neck while they are being put into production in Australia.

The Commonwealth Corporation is probably best known for its "Boomerang" single-seat fighter, which has been putting in some useful service in the Pacific theatre of operations. But the company's association with North Americans goes back several years, for they have produced many N.A. "Texan" (AT.16) trainers under the name of "Wirraway." During the dark days of early 1942, when the Japanese advanced closer and closer to Australia, the "Wirraways" were converted into two-seat fighters, with two fixed forward-firing machine-guns and one movable gun in the rear cockpit. They were flown into action with great heroism by R.A.A.F. pilots when the Japs raided Darwin. Later they were used for daring and highly successful reconnaissance raids over New Guinea, during which they even shot down several of the enemy's vaunted "Zero" fighters. The "Boomerang" was based on the "Wirraway," but is much more formidable, with an armament that includes cannons. Now the Commonwealth-built "Mustangs" will provide the R.A.A.F. with one of the world's finest and fastest single-seat fighters.

The latest version in use with the U.S.A.A.F., and shown in the lower photograph on this page, is powered by a Packard-built Rolls-Royce "Merlin" engine, and has a top speed of over 425 m p.h. In addition to its standard armament of six .50 in. machine-guns it can carry three American-type "bazooka" rockets under each wing. J.W.R.T.



A Fairey "Firefly" with the wings folded back. (See special article on this interesting British fighter on page 148).

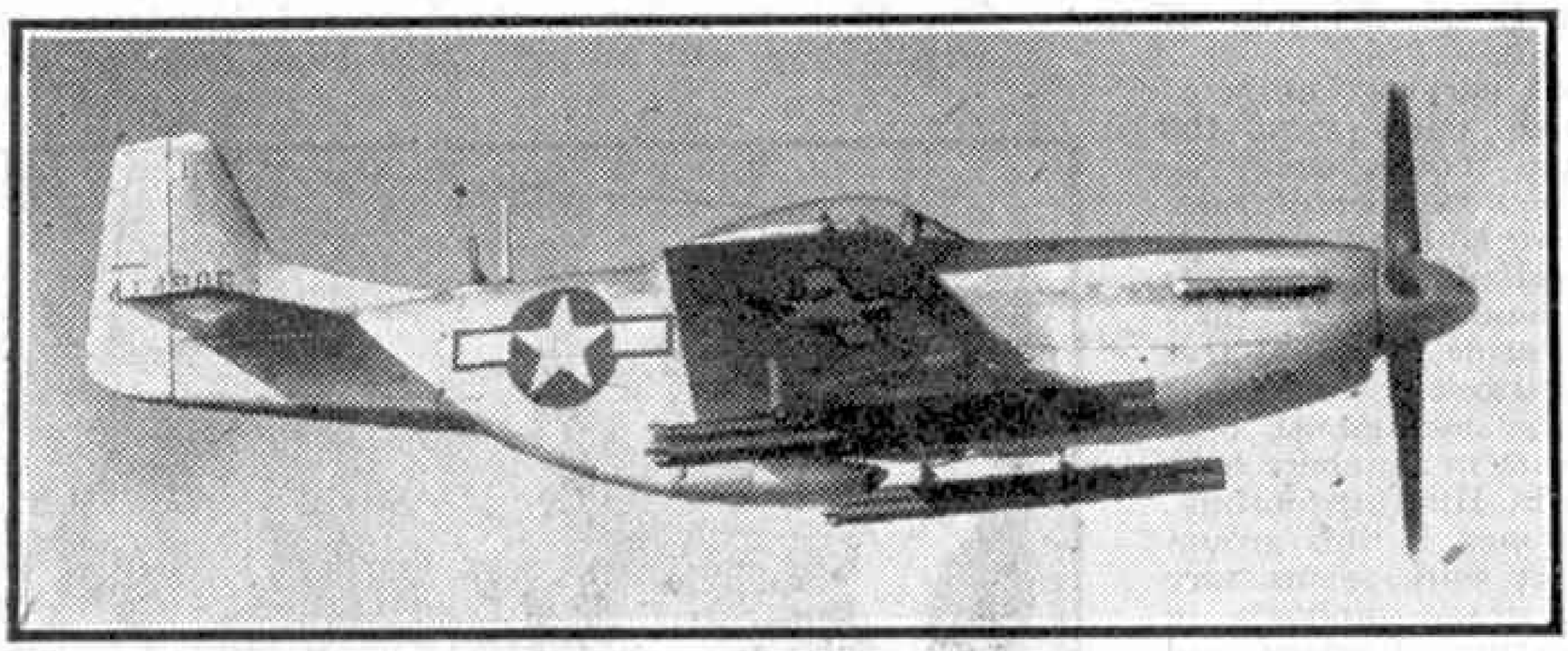
Allied "Jet" Planes

Some details about new British and American "jet" propelled fighter aircraft have at last been officially released. The first to fly into action was the Gloster "Meteor," which put in some useful service against the flying bombs during last Summer and is now operating on the Continent. The interesting point is that it uses paraffin as basic fuel, and the official release states that no flames are emitted from the rear of the engines when the machine is airborne. It is well to remember that Glosters designed the first Allied reaction-propelled aircraft, to specification E 28/39, which was powered by the unit designed by Frank Whittle of the Royal Air Force and built by Power Jets Ltd. As a result of the success of this aircraft and its revolutionary engine, the de Havilland Aircraft Company, Glosters and Rolls-Royce all set to work to produce "jet" engines based on the Whittle engine but incorporating their own theories.

When Glosters finally evolved the design of the "Meteor," it was decided to equip it with two Rolls-Royce units, and so the products of this great engine company continue to power Britain's front-line fighters. Meanwhile a Whittle engine was sent to America and put into production in slightly modified form by the General Electric Company for use in the twin-engined Bell "Airacomet" (see March "*Air News*"). As faster Allied "jet" planes are now in production the "Airacomet" has been assigned to training duties.

The de Havilland jet-propelled fighter, the prototype of which was built in 1943, is powered by de Havilland. As its existence has been officially announced it is reasonable to conclude that it is in production, but no details have yet been released. One of the de Havilland engines was sent to America in 1943 and installed in the Lockheed P-80 "Shooting Star," which was, incidentally, developed from the original aeroplane designed and built by de Havillands.

The "Shooting Star" has already been referred to by Gen. Henry H. Arnold of the U.S.A.A.F. as "the fastest plane in the skies"—presumably he meant only American skies. J.W.R.T.

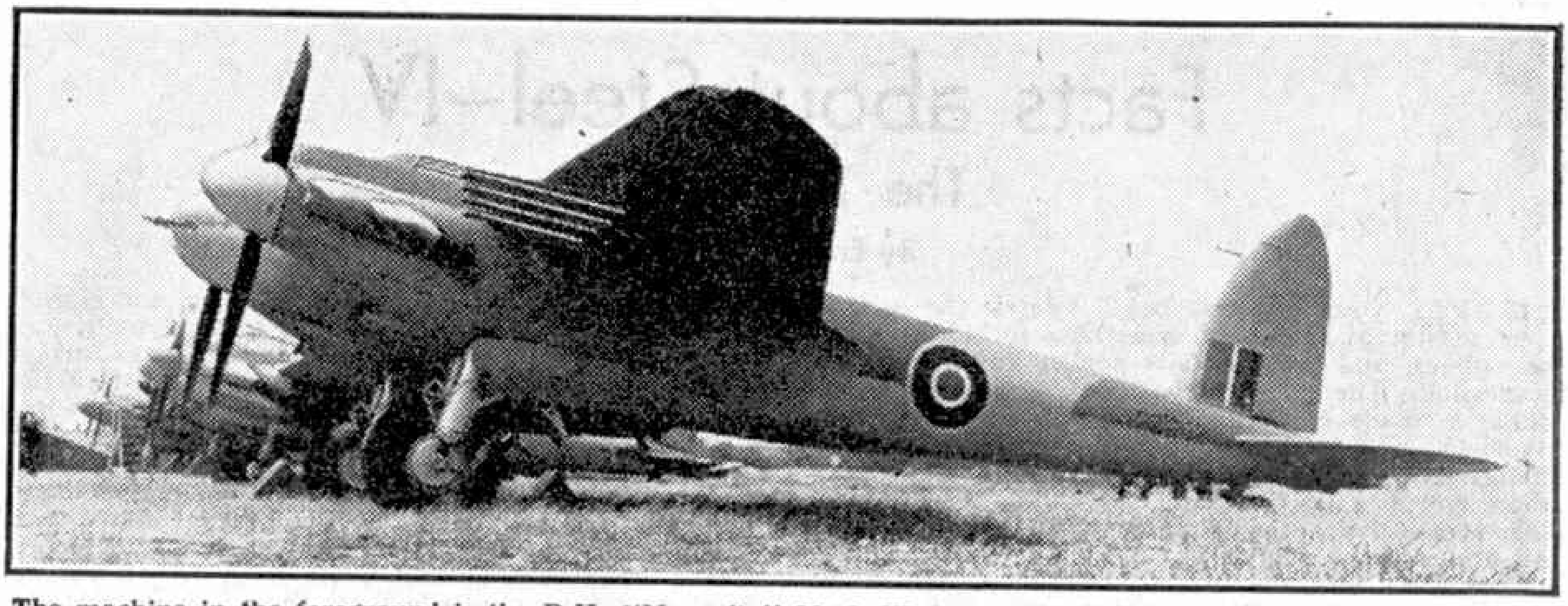


N.A. "Mustang" fighter with three American-type "bazooka" rockets under each wing. Photograph by courtesy of North American Aviation, Inc., U.S.A.

The "Wellington" Mark XIV

Further information on the Vickers-Armstrongs "Wellington" XIV (see April "*Air News*") corrects earlier reports that the Leigh-light carried by this aircraft is mounted in the nose. The Leigh-light is, apparently, carried at the rear of the bomb-bay and is fully retractable when not in use. It is, however, operated by the bomb-aimer from the nose of the aircraft, from where he also controls the "special equipment" in the "chin."

J.W.R.T.



The machine in the foreground is the D.H. "Mosquito" Mark VI fighter-bomber, equipped to carry four 60 lb. rocket projectiles under each wing. Photographs on this page by courtesy of de Havilland Aircraft Co. Ltd.

Still More "Mossies"

Since the paragraph on the D.H. "Mosquito" Marks IX and XVI was written for the "*Air News*" of March last, two further versions have been announced. The first is the Mark VI fighter-bomber, equipped to carry four 60 lb. rocket projectiles under each wing, outboard of the engines. The Mark VI is, in fact, a flying arsenal, for, in addition to its eight rockets, it can also carry four 20 mm. cannon, four .303 in. machine-guns and two 500 lb. bombs in the rear part of the gun-bay.

"Mosquito" rocket-fighters have already seen a lot of action against German shipping sheltering in Norwegian fjords, their long range, manœuvrability, and high speed making them ideal for this difficult task. The rocket-firing machines are often mixed with other fighter-bomber "Mosquitos" armed with six-pounder guns or carrying four 500 lb. bombs, so the enemy never knows quite what to expect—except that it is certain to be unpleasant.

The other new "Mosquito" lacks the graceful lines of its forerunners but has played and is still playing an invaluable role in the war in the air. Very few details of this version have so far been released by the censor, except that its "bull-nose" contains special equipment for night fighting. The equipment has, incidentally, also been used a great deal in the Bristol "Beaufighter," Britain's first specialised night-fighter.

J.W.R.T.

By Qantas Across the Indian Ocean

The Qantas "Kangaroo" service across the Indian Ocean is now carrying payloads comparable to those carried pre-war by the "Empire" flying boats. On His Majesty's Service, giant four-engined "Liberators" cross the Indian Ocean each week, carrying 15 passengers and a crew of five. Meals, packed in attractive cartons, are provided on the aircraft. These, like the journey, are themselves an adventure. When the seal of the large carton is broken and the lid removed, numbers of small boxes and packets are revealed, and the delight of the subsequent exploration is only equalled by the variety and freshness of the meal itself.

After leaving Perth, a landing is made at a service aerodrome which is being rapidly equipped, as far as conditions permit, to handle Qantas aircraft and passengers. The service personnel in the area are particularly co-operative and do much to make the passengers' short stay enjoyable. On arrival passengers alight and the aircraft taxies to a special area set aside for it where it is refuelled with the thousands of gallons of petrol necessary for the 3,100-mile crossing.

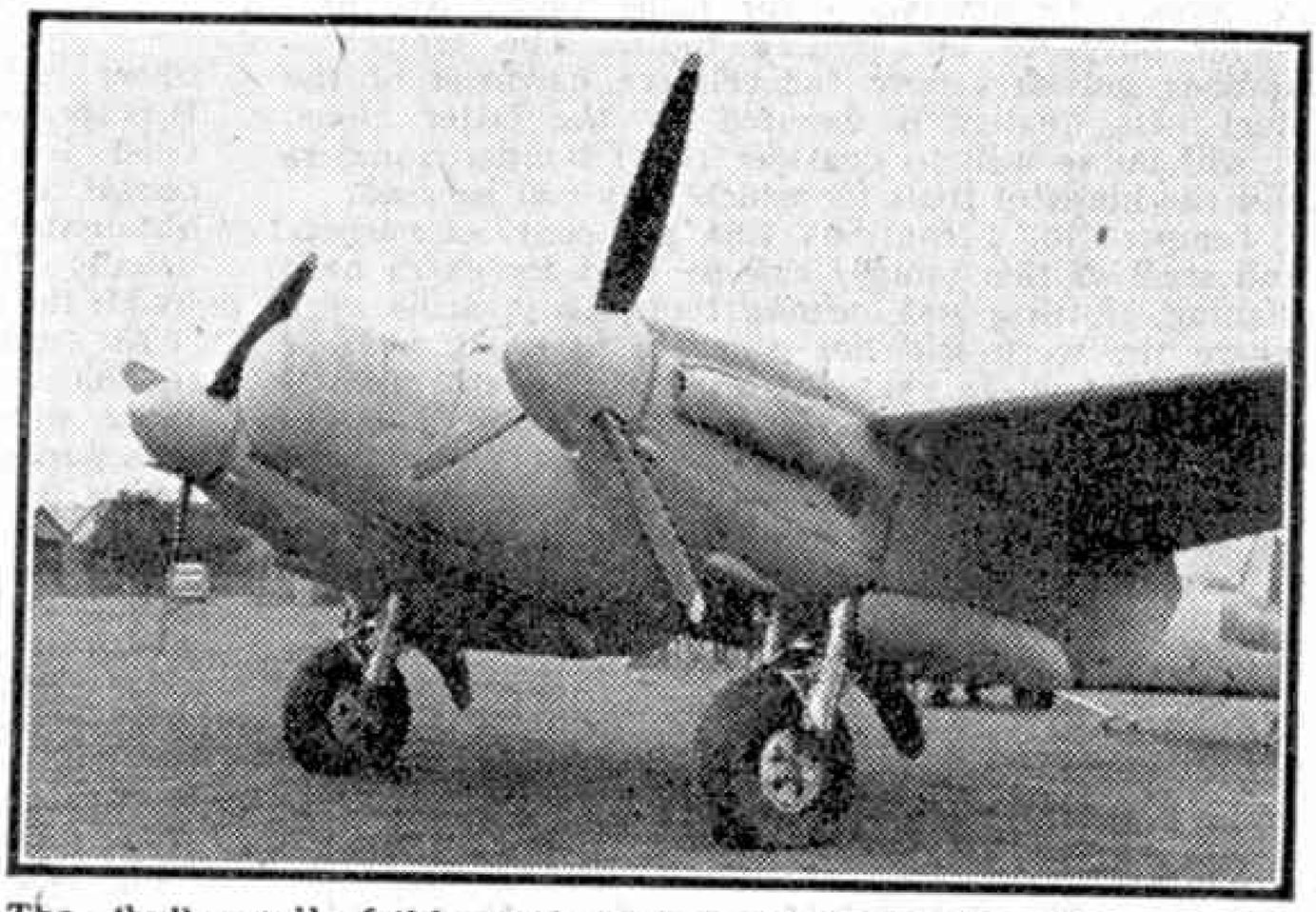
Passengers are escorted along a gravel path through a sea of salt bush to huts which have been erected for their convenience in this "No Man's Land." These huts are made of masonite and jarra and are lined with heat insulating canite. Between them is a shelter made of spinifex grass. The huts are furnished and painted in light pastel shades which give an extremely pleasing effect and cause considerable surprise in such an isolated and wild locality.

Iced drinks from the refrigerator and cakes and biscuits are served for afternoon tea. Reading matter is provided for those who prefer to remain in the cool indoors rather than watch the refuelling of the aircraft. After a stop of approximately 1½ hrs. passengers are in the air again, settling down for the crossing. Supper is the main event in an otherwise uneventful flight. This, like luncheon, is also served in a carton. The meal is kept fresh in a special ice chest where it is placed before leaving Perth.

Some hours later Ceylon is below, and the aircraft touches down at a service aerodrome a few miles from Colombo

* * * *

Short Brothers (Rochester and Bedford) Ltd., have presented to the City of Rochester Museum six models of Short aircraft illustrating the company's progress since 1911.



The 'bull nose" of this version of the "Mosquito" contains special equipment for night fighting.

Facts about Steel—IV

The Tool Steels

By Eric N. Simons

"EMPTY your pockets, boy!" orders the schoolmaster in search of something forbidden. The boy obeys, and out comes a pocket knife, a prized possession. The sharp (or battered, as is more usual) blade is made of carbon tool steel, probably from Sheffield. But pocket knife blades are not the only things made of tool steel. Go into the carpenter's shop, and pick up the plane, the chisel, the bradawl, the screwdriver, the circular saw, the bandsaw. All are made of tool steel.

Pass next into the blacksmith's shop, and study the hammer, the cutting implements; find an engineering works in your district, and watch the lathe at its work of turning metals, the drill boring into steel, the punch thrusting its way through sheets of brass or aluminium alloy, the die pressing out intricate shapes. All these are made of tool steel. Tool steels, in fact, are probably the most vital steels of all, for without them little could be done to work the metals of the earth into their final forms, and we should have to go back to wood and stone as the primary materials of civilisation.

In a previous article I told of the way in which tool steels were made, and now I propose to tell the reader rather more about their extraordinary variety and interest. I will begin with the carbon tool steels which, though less expensive and complicated than the other types, are probably the greatest in bulk of steel devoted to them.

Above all things, a tool steel for most purposes must be hard. If it is not hard, it will not cut. It soon became evident to the early tool makers that carbon was the principal element necessary to give steel hardness, and the carbon tool steels may be regarded as the first genuinely effective cutting materials, superseding the flint, bronze, and iron implements for this purpose with which the earlier civilisations had to make do.

As made to-day, carbon tool steels comprise six different qualities, all hardened in water. In each of these qualities six different degrees of hardness, called "temper" are obtainable, and as a rule each bar is marked with a quality letter (A, B, C, etc.) and a temper number (1 to 6). Number 1 is the hardest, and would be suitable in certain circumstances for lathe tools; No. 6 would only do for smith's tools. The temper number indicates only the relative hardness of the steel. Its quality is denoted by the letter alone. It will be as well to consider these temper numbers and the kinds of tools for which they can be used.

Temper No. 1 contains 1.35 per cent. of carbon, and steel of this temper can be used for extra hard planing, slotting and turning tools, twist drills, etc., where the work will not generate so much heat at the cutting edges that the "temper" of the tool is drawn, that is it loses its edge, and the tool breaks down.

Temper No. 2 has 1.20 per cent. of carbon, and is suitable for lathe tools, drills and small cutters.

Temper No. 3 has 1.05 per cent. carbon, and can be used for large turning tools, cutters, taps, reamers, drills, punches, blanking tools, etc.

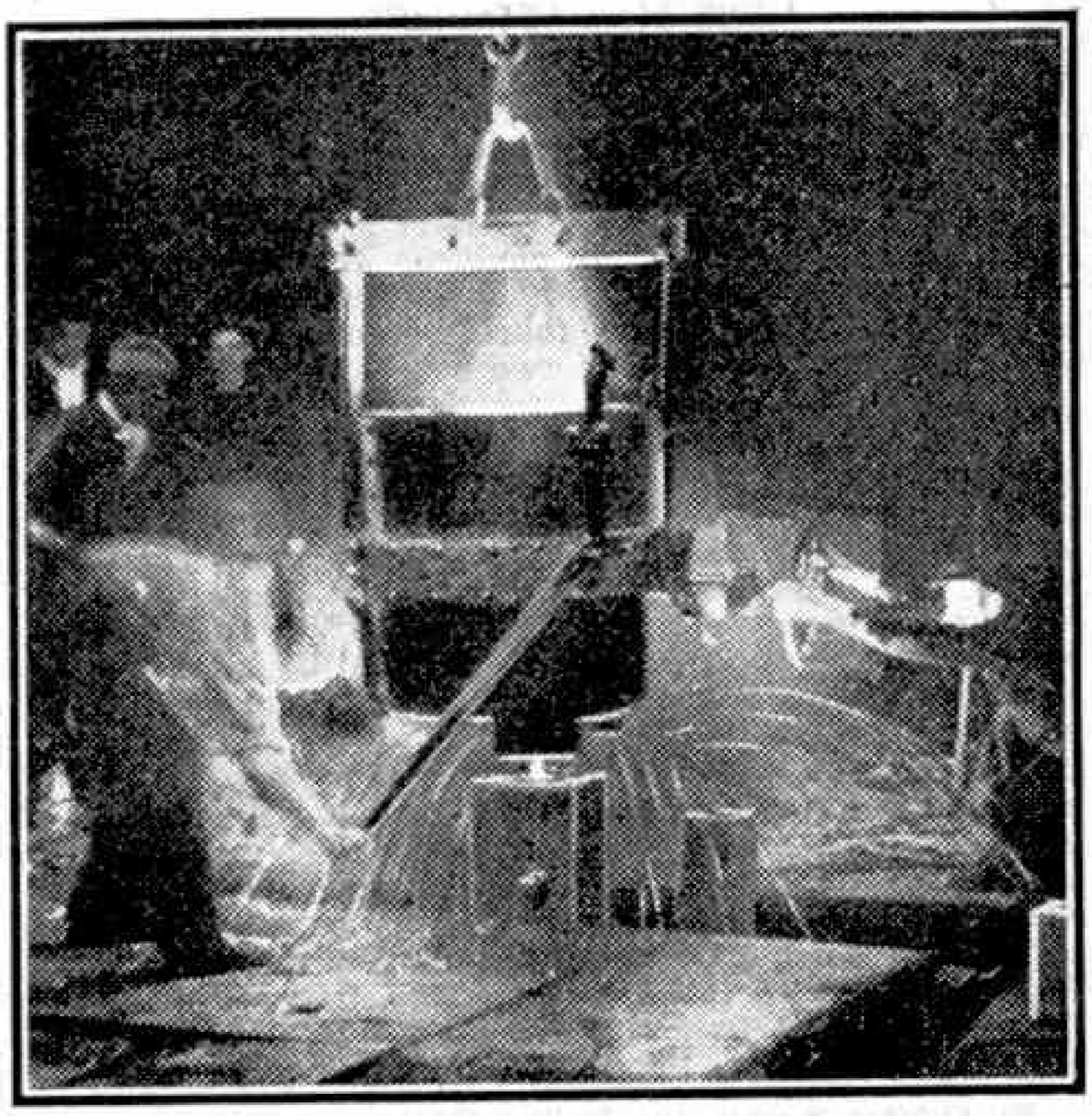
Temper No. 4 has 0.90 per cent. carbon; it is used for cold chisels, that is chisels for cutting cold metal, for blades for shearing hot metal, for blacksmith's sates for cutting hot metal, for taps for providing holes with their screwed threads, special miners' drills, etc.

Temper No. 5 has 0.75 per cent. carbon, and is suitable for chisels, sates, blacksmith's tools, blades for shearing metal cold, etc.

Temper No. 6 has 0.6 per cent. carbon, and is used for boilermaker's tools, hammers, miners' tools, etc.

It is better, however, not to order a piece of carbon tools steel by the temper number, but to state the purpose for which it is intended. The size of the bar necessitates different tempers when the steel is used for the same purpose, and the steel maker's experience enables him to supply the temper most suitable. For example, I have suggested above that Temper Nos. 1, 2 and 3 are suitable for turning tools, but a large turning tool made from No. 1 temper steel would be unsatisfactory, though under certain conditions a small one would not.

There is another kind of carbon tool steel called

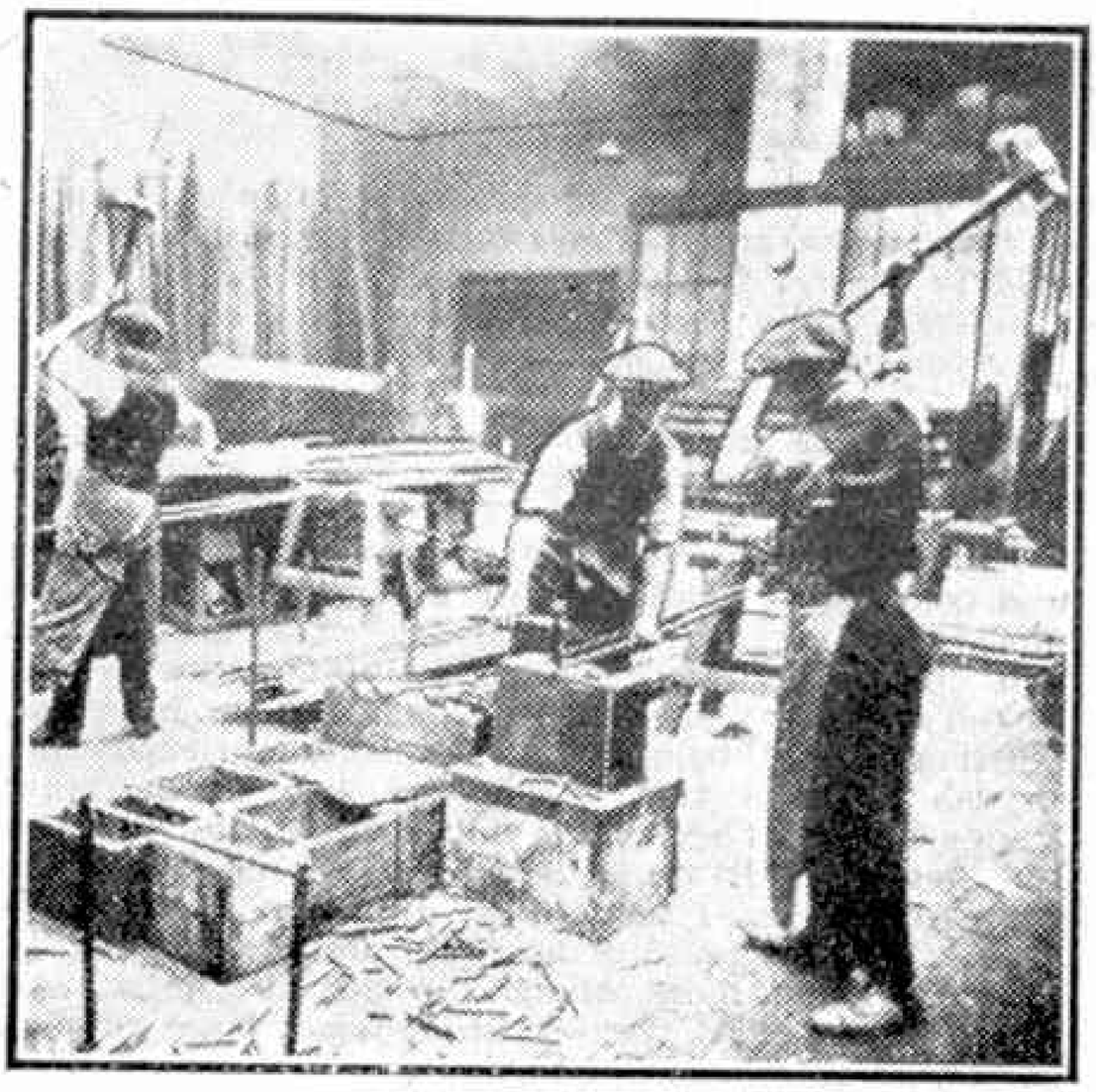


Casting ingots of Tool Steel.

silver steel because of its bright, polished appearance. It is specially useful for boring tools, punches, reamers, twist drills, watch and clock parts, electrical work, dental tools, etc., in small sizes. Any length is obtainable up to 50 ft., and the lengths stocked are usually 13 in. and 40 in. Intermediate sizes can be had if the total quantity required is not less than 14 lb.

As mechanical invention progressed, tools or machines began to be made that were faster and more powerful than any previously known. This was particularly true of machine tools, which include lathes, drilling machines, planing and slotting machines, milling machines, etc. It was soon found that the steels used for tools could not stand up to the work when used in these powerful appliances, because the heat generated in cutting was so great that the edges broke down. Consequently, a manufacturer who had spent several thousands of pounds in installing an up-to-date machine tool found he was getting no better results than with his old tool. This meant that he was wasting his money.

It became evident that some better cutting steel was needed, and it is in fact a moot point whether it was not the discovery of this better steel that brought about the designing of better machine tools,



"Ending" bars of Tool Steel to ensure soundness.

rather than the invention of better machines that caused a demand for better tools. The truth is probably between the two. However this may be, a clever man called Robert Forrester Mushet, working in the Gloucester region, discovered what he called a "self-hardening" steel, which, if heated to a certain temperature and cooled in the air, proved a very much harder and better cutting material than any carbon tool steel known. The explanation was that Mushet had introduced into the composition a small percentage of the element known as tungsten. Tungsten has the peculiar property of making steel "red hard," that is, enabling it to retain its cutting power even when heated to a red heat. It will be obvious that this was a most important discovery, because it meant that the heat generated in cutting metals would be less likely to cause the tool to fail. Tools could therefore be run at higher speeds without risk of failure, or more power could be used in cutting, and therefore a higher output could be obtained or heavier (deeper) cuts made.

Mushet made his discovery towards the end of the last century, and one who worked with him at the time has told the writer how for a long time they discussed whether or not to patent the invention. My informant advised against patenting the steel, because this was "a quick way of telling everyone how it was done," and so the steel's composition was kept secret for many years.

Then, in 1905, an American named Taylor and a co-worker named White discovered the first "high speed steels," which, containing 14 per cent. of tungsten, proved as great an advance on the self-hardening steel as the latter had been on the carbon tool steels. The new steels had a revolutionary effect on machine tool design, and we owe the mass-production of to-day in no small measure to these remarkable tungsten high speed steels.

British practice concentrates on four main qualities of high speed tool steels. The most important of these is the high cobalt, high tungsten super high speed steel, which is used exclusively where the machine tools are of the most modern and powerful type, demanding maximum cutting speeds, feeds and cuts, which even a good standard high speed steel cannot give. It is suitable for any tool made of high speed steel where the conditions of use are appropriate.

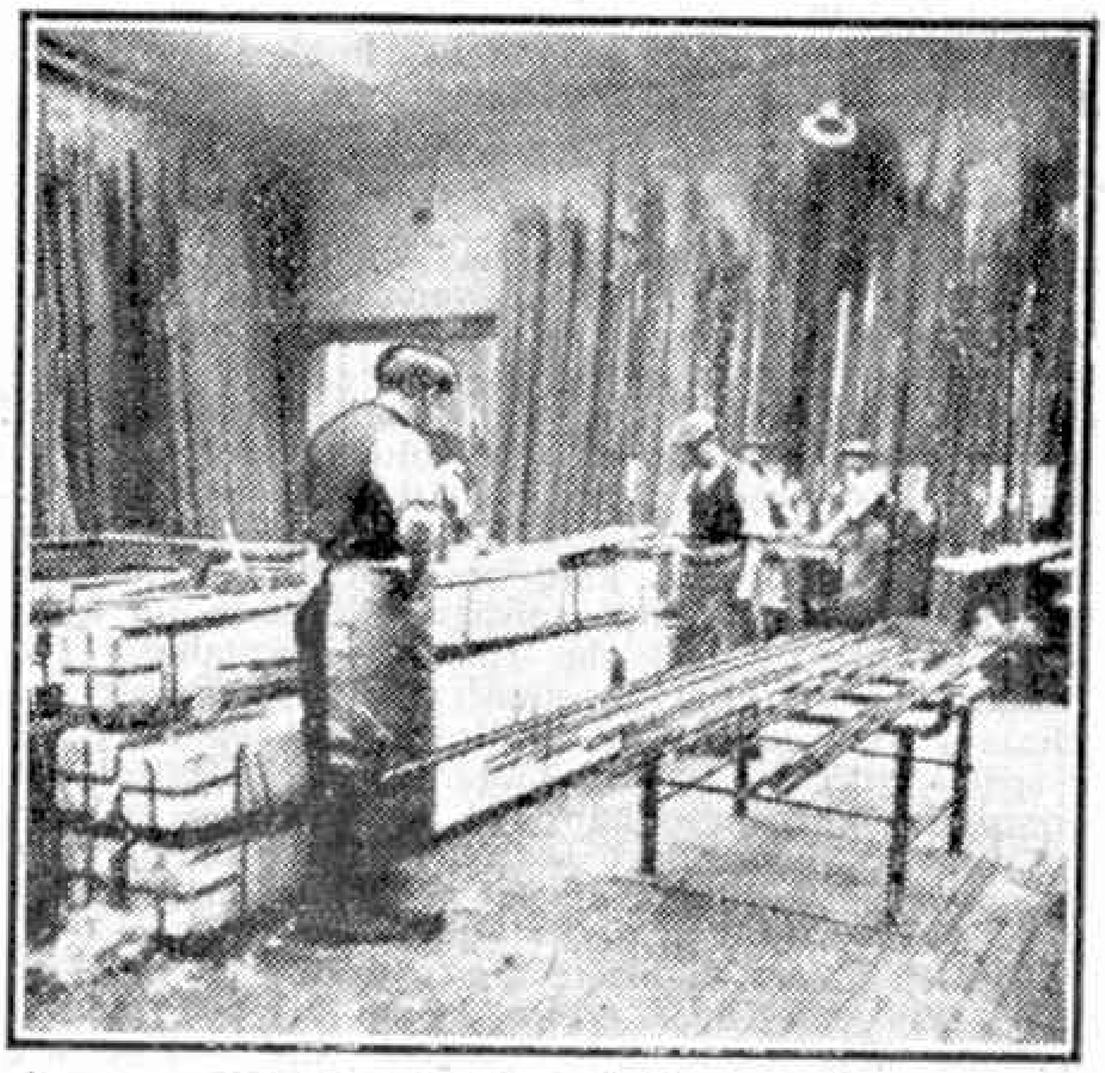
The second quality is a steel high in tungsten, but with a lower cobalt content. This steel, while not able to tackle such tremendously difficult jobs as the super high speed steel earlier described, will tackle difficult jobs at a speed that renders lower grades and less expensive qualities of high speed steel unprofitable. It is, for example, often used for turning the worn steel locomotive tyres after they have been rendered hard on the tread by skidding and the friction of tyres.

The third quality is a general purpose and highly reliable steel containing 18 per cent. of tungsten, or, in war-time, 16 per cent. of tungsten and 1.5 per cent. of molybdenum. When the war with Japan broke out, Britain lost some of her most valuable sources of Tungsten, in Burma and China, and in consequence molybdenum, which has a similar effect to tungsten, has had to be used to some extent in the composition of the steel to economise in tungsten.

Lastly, comes the 14 per cent. tungsten quality, suitable for ordinary work where the demands made upon the steel are not too exacting, and where speed is not the first consideration. This steel is far less used to-day than it used to be when I was a young man, because now all the emphasis in manufacture is on speed and economy, and the development and ever-increasing use of the most powerful machines make the use of lower-grade high speed tool steels uneconomical in all but exceptional instances.

As indicated in an earlier article, British steel makers have consistently discovered new and better ways of making these high speed tool steels, but they have also done something else. All tool steels, as an earlier contribution showed, have to be heat-treated or "cooked." British steel makers have discovered that a double-cooking of high speed steel considerably improves its performance. This they call giving it the "secondary treatment." The higher the quality of the high speed steel, the more apparent is the effect of this treatment, which greatly increases the cutting efficiency and hardness of the tools.

We now come to a range of special alloy tool steels of extraordinary diversity of composition and application. It would be impossible within the limits of this article to describe every one of these steels, and I shall therefore confine myself to the more important. Of these, perhaps the die steels are the most interesting. When you look at a pen nib, you see the product of a die steel. A thin sheet of strip metal passes between an upper tool called a punch and a lower tool called a die. The die is stationary, but the punch descends and forces the metal into an impression cut in the die, so that the shape of the nib is forcibly acquired by the steel. The steels of which both punch and die are made must have (*Continued on page 178*)



Packing Tool Steels for export.

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With the exception of those issued by the Scientific and Children's Book Clubs, which are available only to members, and certain others that will be indicated, these should be ordered through a bookseller. We can supply copies to readers who are unable to place orders in this manner. Order from Book Department, Meccano Ltd., Binns Road, Liverpool 13, adding 6d. for postage.

"THE MODEL AERONAUTICAL DIGEST"
Edited by R. COPLAND and R. H. WARRING

This is one of the best books on model aircraft construction that we have seen, and its 160 pages contain an amount of interesting and valuable data worthy of a book twice its size. It is the work of eight experienced aero-modellers, all of whom are recognised as leading authorities in their own spheres, and one of whom, Mr. R. Copland, is a member of the design staff of Hawker Aircraft Ltd. Their collective knowledge and experience covers all phases of the science of flying model aircraft, and is here made available to both beginner and advanced model maker.

It is the first time that any attempt has been made in this country to collate and set out notes on design, construction, trimming, etc., of all types of models by the leading experts themselves. In addition there are plans of 32 first-class models, all of which have some important record or achievement to their credit, or are otherwise outstanding. These plans are presented in a new manner and give more detail than is usually found on a full-scale working drawing, so that anyone can be assured of producing an accurate replica.

An interesting feature of the book is an introduction by Mr. S. Camm, the designer of the Hawker "Hurricane" and its successors. Mr. Camm points out that aviation owes much to the model-maker, and mentions also that his own interest in aviation began in 1906–7 with the making of small rubber-driven models, then called "flying sticks." Referring to the fine model aircraft built to-day he says: "There is no doubt that the designing of these models has reached a very advanced stage and constitutes a valuable introduction to the profession of Aeronautical Engineering."

The book is published by Model Publications Ltd., Mitcham, Surrey, price 5/4, post free.

"LANDSMEN AND SEAFARERS"
By MAURICE LOVELL (Harrap. 7/6 net)

The "Landsmen" are the Russians and the "Seafarers" are the British, and this is the first volume of a series of three designed to compare and contrast the Soviet Union and the British Empire. The author lived in Russia before and after the German invasion, and in this volume he deals with the circumstances that have shaped the two peoples and finally brought them into close alliance. He tells us briefly what kind of country is inhabited by the 60 different nationalities that make up what we conveniently call the Russians, explaining the immense extent of the country and its variety of climate and conditions, comparing them in these respects with the British Empire. Industries too are compared, and throughout the historical side is kept in view, so that we see how the two countries have reached the positions of power and influence that they occupy to-day.

Finally comes an interesting chapter, "Getting on With the Russians," which explains how the two nations first came into contact and traces the relations between them down to the present time. Mr. Lovell concludes that as "sea animals," to use Mr. Churchill's phrase, we have found the "land animals" with whom it has been possible in the past to do business, and that this offers a sound basis for the future.

As with the series of similar volumes comparing and contrasting Great Britain and the United States already reviewed in the "*M.M.*," the illustrations and charts are a specially valuable feature of Mr. Lovell's book. The illustrations appear in pairs, Russian scenes being given opposite corresponding British ones so that the reader can make direct comparisons. The charts have been designed by the Isotype Institute, to show how the two countries compare in regard to climate, distances, area, population, industry, science and art, and so on. We all wish to know more about the Soviet Union, and here is a splendid way of obtaining a large amount of correct information quickly.

Owing to wartime difficulties, it is impossible to guarantee prompt delivery of books ordered as described at the head of this page, but every effort will be made to ensure speedy despatch.

"MODEL AIR-SEA RESCUE LAUNCHES"
By A. C. HARDY, B.Sc. and D. A. RUSSELL, M.I.Mech.E. (Drysdale Press Ltd. 3/–)

When photographs of Air-Sea Rescue Launches were first released Mr. Russell set out to build models of them to the scale of ½ in. to the foot. After two years of intensive work he produced models of the first four boats in the series, the Walton Thames, Vosper, Thorneycroft and British Power Boat Launches, that proved very successful, and in the book we have details of their construction. Excellent photographs of the originals and of the models, the latter including sectional and part views, show how good the models are, and for constructors who wish to have more details full size drawings issued by the same publishers are available at 18/6 post free for each set, consisting of three drawings which show every part full size, with many part-assemblies, and general arrangement views with all deck fittings. The book itself includes an account of the origin and development of air-sea rescue service by Mr. A. C. Hardy.

The book and the sets of drawings of the four models can be obtained from the Drysdale Press Ltd., 82, Highgate West Hill, Highgate, London N.6.

ASTRONOMICAL AIR NAVIGATION
By Squadron Leader R. HADINGHAM (Technical Press. 12/– net)

This is the second edition of Sqdn. Ldr. Hadingham's book, the first edition of which was reviewed in the "*M.M.*" for May 1943. It has been written specially to meet the needs of practical navigators, and is suitable for both instructors and students. The explanations of the principles of navigation are illustrative rather than mathematical, and the course gives a sound knowledge of navigation.

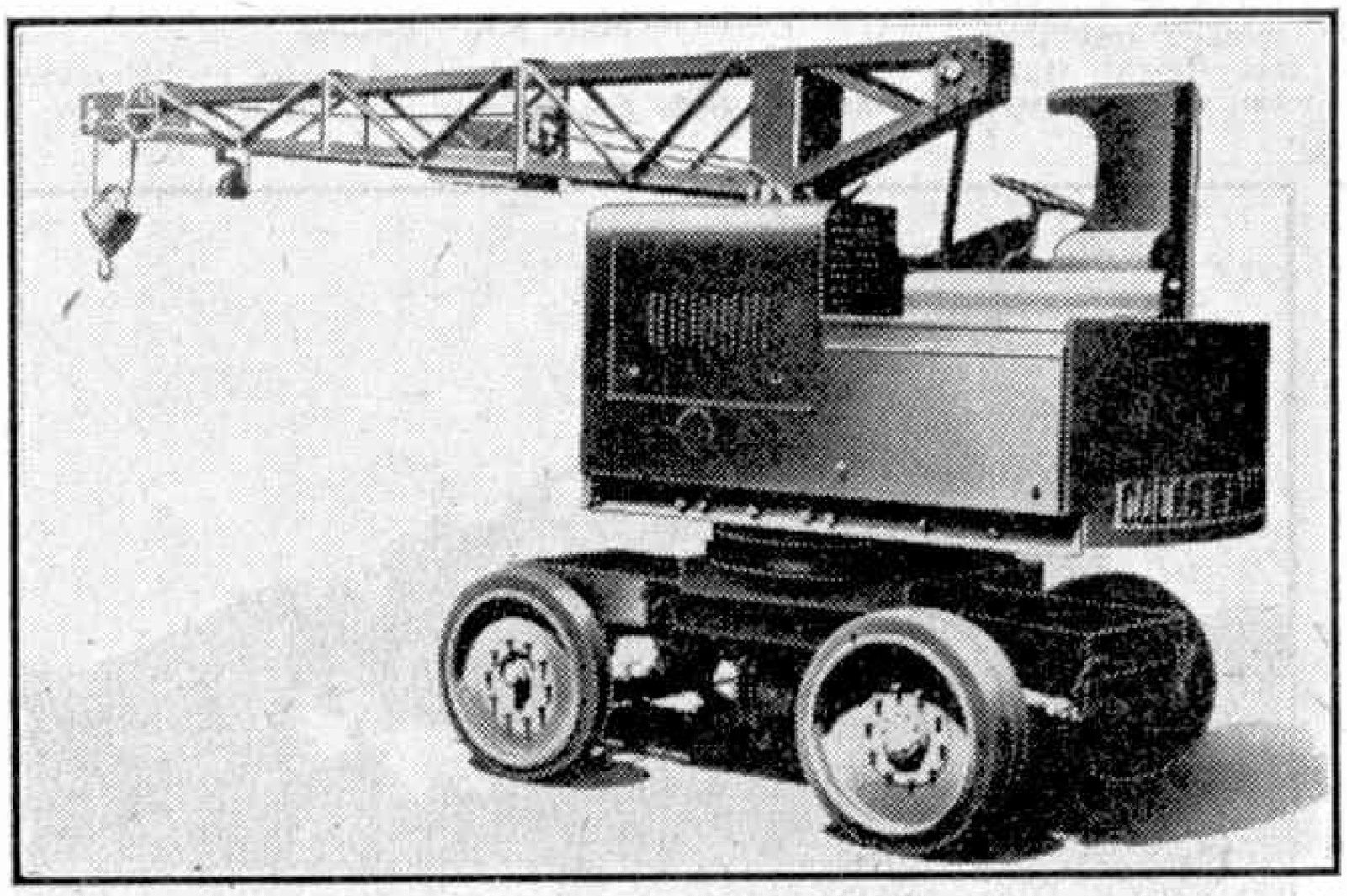
In this second edition the section dealing with star identification and star movements has been enlarged so as to cover this important subject in greater detail, and improvements have been made in the section dealing with astronomy, at the suggestion of Sir H. Spencer Jones, the Astronomer Royal. There are also additional chapters dealing with the Mark IXA Sextant and the Astrograph.

The book is well illustrated by means of 64 well chosen photographs and diagrams, and it includes all the tables required for working examples and solving position finding problems.

Engineering Notes

A Fine Mobile Crane

The illustration on this page shows an interesting 5-ton mobile crane, known as the "Coles" Mark V, which is one of the wide range of cranes manufactured by Steels Engineering Products Ltd., Derby. The crane illustrated is available with either a petrol-electric or a diesel-electric drive, and among its many good features is delicate control of all motions between creeping and full speed. When the crane is not in action the engine runs at "ticking-over" speed, but by depressing the accelerator pedal it can be speeded up to generate full voltage and power as required. This considerably reduces fuel consumption, and as there are no resistances in the system electrical losses are negligible.



The "Coles" Mark V Mobile Crane, which is described on this page. Photograph by courtesy of Steels Engineering Products Ltd., Derby.

As the crane is self-contained with its own power unit it is independent of outside supplies, and its rubber-tyred wheels allow it to be used in any part of a factory indoors or outside. The drive transmission includes a fully-enclosed four-speed gear-box and reversing switch, and the hoisting, derricking and travelling controls are similar to those of an ordinary road vehicle. When the accelerator pedal is released all motion stops and an electro-magnetic brake is applied, making the crane extremely safe in operation. The brakes on the travelling motion are of the hydraulically-operated internal expanding type.

The smooth working and delicate control possible over the various movements at slow speeds makes the crane ideal for lifting and transporting fragile goods, and for such delicate operations as fitting engines into aircraft frames and mounting propellers. The operator controls all the motions from his sitting position in the cabin, and level luffing of the hook when the jib is raised or lowered considerably adds to the simplicity of operation. The crane will lift a load of 5 tons at a radius of 6 ft., 3 tons at 10 ft. or 1½ tons at 17 ft., and has a maximum travelling speed of 4 m.p.h. with load or 8 m.p.h. unloaded.

A 2,000,000 Volt X-Ray Tube

With the aid of a new precision X-ray tube, which operates at 2,000,000 volts, it is now possible to photograph exceedingly thick sections of metal with an exposure time of less than an hour. The tube has been developed and made by Machlett Laboratories Incorporated for the high voltage laboratory of the Massachusetts Institute of Technology in the United States. The new tube gives considerably better definition than has been possible previously when dealing with very thick metal, and its design is fundamentally different from the usual practice in the design of high voltage tubes.

A New Swedish Cruiser

One of two new cruisers that are being built for the Swedish Navy was launched recently from the Götaverken shipyards. The vessel has a displacement of about 7,400 tons and a length of 590 ft. Most parts of the hull are of welded construction and considerable saving in weight has been effected by the use of light alloys for interior fittings. The cruiser is named "*Tre Kroner*" and is the fourth ship in the Swedish Navy to bear this name, the first having been a vessel put into service in 1598.

A New Irrigation and Power Scheme for India

It is hoped to start construction in the near future on a big irrigation and power scheme in India. The principal features of the scheme are a masonry dam, 7,000 ft. long and 130 ft. high, across the Tungabhadra River, at a point where it cuts through the Sundur hills, a canal 200 miles long on the Madras side, and another canal 160 miles long on the Hyderabad side. The dam will create a lake covering nearly 200 square miles, and this will hold enough water to irrigate 500,000 acres of Madras and 500,000 acres of Hyderabad territory. Hydro-electric power is also to be generated at a plant to be erected on the Hyderabad canal, which will have a capacity of 75,000 kW. The supply will be distributed to towns within 400 miles range.

Transport on the Amazon

Small 200-h.p. tugs built in North America are now being used on the Amazon and its tributaries. They are equipped with diesel engines and navigate waters from 25 to 30 ft. deep, towing cargoes of petroleum from the Ganzo Azul oilfields to Iquitos. The total distance covered by the journey is about 650 miles, and the travelling speed varies from 7 m.p.h. with a load of 500 tons to 2½ m.p.h. with loads of 8,000 tons. Small barges of about 100 tons and measuring from 25 to 65 ft. in length are used to negotiate the tributaries that branch from above this point.

Birmingham's New Road Safety Device

Pedestrian crossing signals, designed to prevent road accidents at the busiest part of Birmingham city centre, are now in operation. At the head of the traffic light signals in the centre of the road "*Don't Cross*" and "*Cross Now*" notices have been fixed, in such a position that they can be clearly seen by pedestrians approaching the crossing from any direction. These notices are electrically operated in conjunction with the traffic lights.

Railway News

London and North-Eastern Tidings

Two more new "A2/1" "Pacifics" recently turned out from Darlington are Nos. 3698–9. The works number of the former is 1944 and she was completed in November 1944. They are equipped with electric lighting for headlamps and for internal illumination inside the cab, as explained in last month's "*M.M.*"

There are three unrebuilt "B12" 4–6–0s on the G.E. section—Nos. 8521, 8531 and 8534, all stationed at Yarmouth. The remaining engines still classified "B12/1" are in Scotland; the A.C.F.I. feed-water heating apparatus has been removed in all cases. No. 8507 has one of the new standard, small round-topped boilers. Class "P2" is extinct, all six 2–8–2 express engines of this class having been converted to "A2" 4–6–2s. One of them, No. 2003 "*Lord President*," was shedded at King's Cross for a month or so, during which period she worked test trips on partially braked, 60-wagon fast freight trains between London and Doncaster, when speeds of well over 30 m.p.h. were averaged for long distances. "A2/1" No. 3697 and "V2" 2–6–2 No. 4792 were also tried under similarly onerous conditions. Each type has 6 ft. 2 in. driving wheels, but there are differences as regards size of cylinders, fire-box, etc. Some good runs were made also by No. 2003 on heavy expresses between Grantham and King's Cross, when up to 16 min. were recovered from the war-time allowance after late starts and subsequent delays. When conditions permitted, Gresley "Pacifics" have of course done similarly well.

Eight "B1" 4–6–0s of the new "Antelope" class are now working on the G.E. section, the other two being in Scotland. Nos. 8301 "*Springbok*" and 8304 "*Gazelle*" also run from Cambridge to King's Cross. New 4–6–2 No. 3697 was recently transferred from King's Cross to Gorton, Manchester, but is now back at King's Cross. Several "Sandringhams" also are stationed at Gorton, but no "Pacifics" now, the latter having been replaced by "Green Arrows." This has been the case also at Copley Hill depot, Leeds, which provides power for certain expresses as far as Grantham. Last year 17 L.M.S. "8F" type 2–8–0 freight locomotives were built by the L.N.E.R. for that company's use, and given L.M.S. numbers 8511–27.

Further conversions from "04" to "01" modernised 2–8–0 include Nos. 5408, 6243, 6288, 6350, 6515, 6578 and 6626. The rebuilds work a good deal over the hard road between Manchester and Sheffield. No. 5147 G.C. 0–8–0 has been rebuilt as an 0–8–0 shunting tank, so moving from class "Q4" to "Q1." Two more ex-N.E. 3-cyl. 4–6–0 mixed traffic engines have been provided with separate sets of Walschaerts gear, thus graduating from "B16" to "B16/3"; they are Nos. 1371 and 1384.

The first inside-cylindered 4–6–0 express locomotive of the "Sam Fay" or "B2" class to be withdrawn is No. 5426 "*City of Chester*." The six engines of this type were built in 1912–13, being followed by their smaller wheeled version, the "Glenalmond" "B8" mixed traffics. They now have the standard largest Gorton boiler as on the unrebuilt "B3s" and also on the "B7" type. "Atlantics" that have gone include "C1" Nos. 3277, 4414, 4427, 4431, 4407 and 4418; all but the two last named still had slide valves and 18¾ in. cylinders. Others to go have been "C4" Nos. 6087, "C6" Nos. 699, 701, 703 and 1794, and "C7" Nos. 721, 734, 2172, 2194 and 2199. Further scrappings include "D9" rebuilt 4–4–0 No. 5104 "*Queen Alexandra*"; 0–6–2T No. 2479, of the former Hull and Barnsley 4 ft. 9 in. series, with round-topped fire-box, dating from 1900 and classified "N11" by the L.N.E.R., and former M. and G.N. 4–4–0s Nos. 050 and 077. The withdrawal of No. 09 removes the last of the interesting little trio of 6 ft. outside-cylindered 4–4–2Ts from the stock book and renders class "C17" extinct. Owing to serious damage, No. 8200 of the "J17" Great Eastern 0–6–0 type, rebuilt from "J16" in 1932, is the first of that class to be broken up.

A reader reports that the through Sunday Sheffield-Swindon working still brings a variety of L.N.E.R. engines on to the G.W.R. at Banbury, including "Green Arrows," "Sandringhams," Ivatt "Atlantics" and G.C.R. "Directors."

More S.R. "Pacifics"

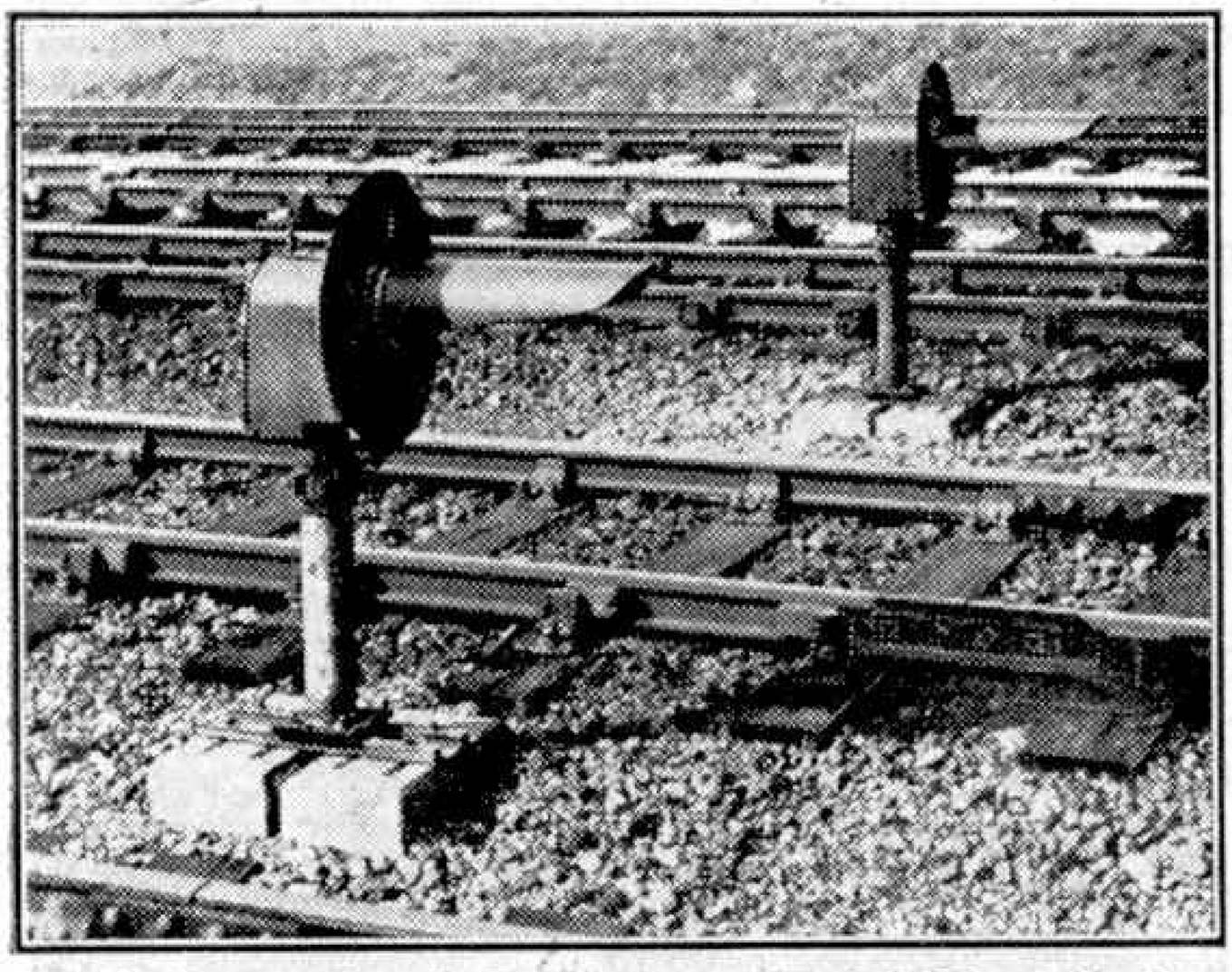
At least four of the second series of "Merchant Navy" 4–6–2s are now at work from Waterloo to Bournemouth, Salisbury or Exeter. No. 21C 11 was named "*General Steam Navigation*" at a ceremony at Waterloo station on 20th February. The newest engines of the class incorporate modifications to the airscoop design at the front end, with a view to improving the lifting of smoke or exhaust steam. Side screens are fitted alongside the smoke-box to neutralise down draught. All the "Merchant Navy" locomotives carry electric lighting equipment. We understand that No. 21C 101, the first of the new "West Country" smaller 4–6–2 type, is completing at Brighton.

L.N.E.R. Manchester express hauled by two Robinson "Atlantics" in the livery of the former Great Central Railway. Photograph by H. Gordon Tidey.

Interesting New Signals on the L.N.E.R.

Gone are the days when all the signals on the King's Cross-Doncaster main lines or principal branches were of the former Great Northern "somersault" type, pivoted to an iron bar extending out at right angles from a tall post; gone too are the days when every running signal had a semaphore arm for daylight observance. "Somersaults" may still be seen in places, but their successors, with upper quadrant arms slotted into the posts, are now much more common. Drivers are also having to become accustomed to various new types of signals which are of interest to travellers or lineside observers.

Some of these display electric light indications only by means of either two, three or four differently coloured lenses easily visible by day or night. There are dwarf colour-light distant signals, like those illustrated on this page, displaying yellow caution or green clear aspects. They change automatically from yellow to green by electrical means as soon as the starting and home signals at the signal box in advance go "off," thus saving a lever pull by the signalman.



Dwarf distant colour-light signals on the L.N.E.R. main line. Photograph by courtesy of the L.N.E.R.

These dwarf signals, which have recently been installed on the up main and slow lines near London, are of special interest. They are of the searchlight type and provide an effective alternative on long straight stretches to the more expensive signals erected on gantries and brackets, in places where posts of the usual height cannot be used. They are readily visible from the cab, and in certain conditions there is less interference from fog and steam blowing about than with signals placed at the usual height. Those illustrated become visible when a train passes the starting signals 1,310 yds. behind them. They have taken the place of signals on a long bridge.

Then there are three-aspect or four-aspect colour-light signals that must not be passed if showing red, but which act as outer distants, or distants, as well as displaying a green light if the section ahead is completely clear. In addition there are bracket signals of the colour-light type at points where relief line running loops begin or end; "banner" repeaters, which are miniature arms or rathe bars moving in a glass-fronted case to indicate the state of the signals ahead; and single semaphore or colour-light signals at a point where several lines diverge, with a panel fixed lower down on the post in which appears a letter indicating which route is set, such as "M" for Main, "S" for Slow, "L" for Leeds; "C" for Caution, on diversion to a goods line that may not be clear throughout, or other variant according to local conditions.

On sections completely controlled by colour-lights as well as in the case of isolated signal posts of that type, some of the new style lamps are "approach lighted"; this means that in order to save wear and current they only light up when a train or engine is approaching and has entered upon the appropriate stretch of track, on which the wheels make the necessary electric contact. Whether worked by a signalman or operating automatically, such signals then light up at the correct aspect set at that moment, the light being extinguished again when the last vehicle has passed within a certain distance.

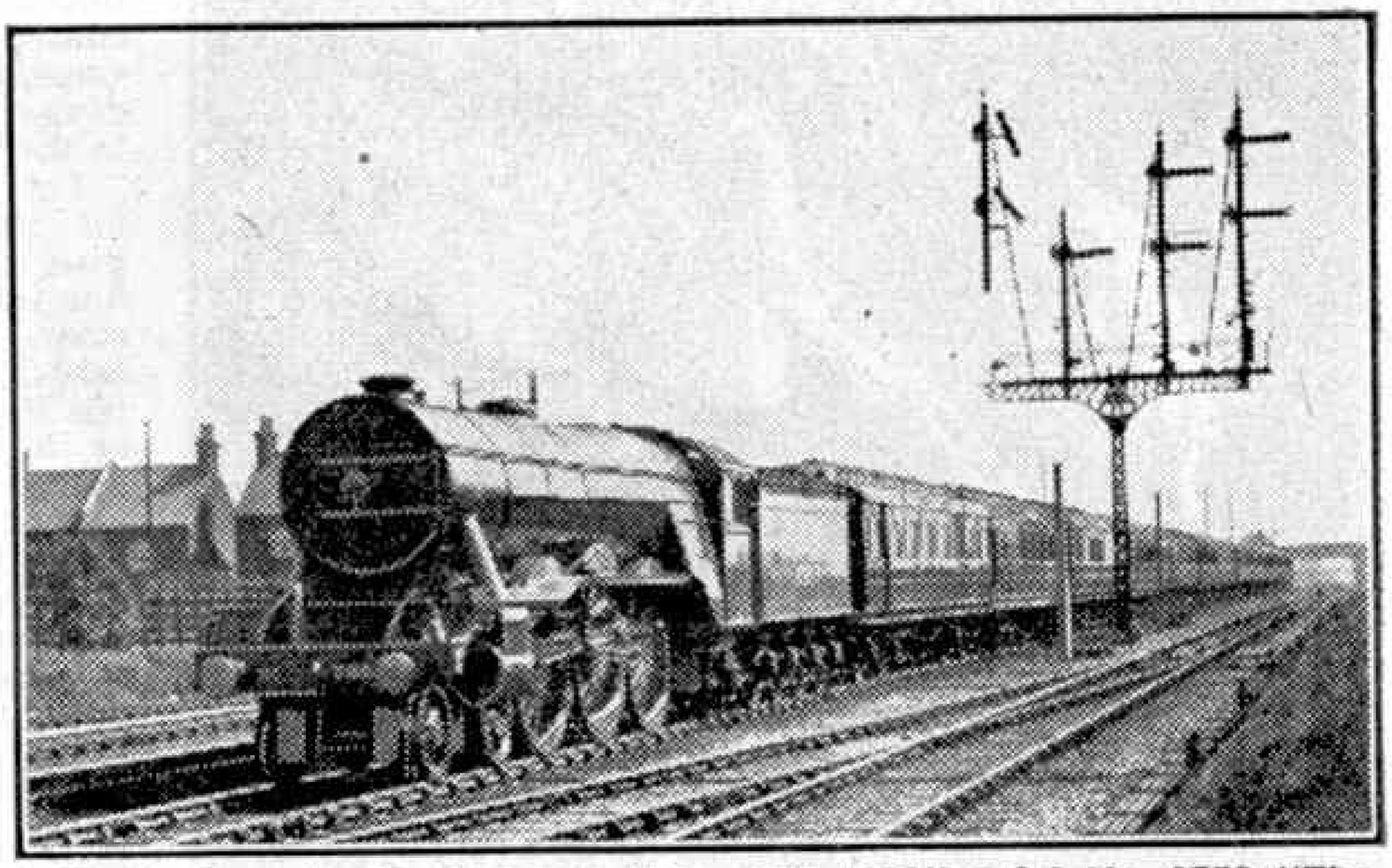
G.W.R. Stores Replacement

Each week five special stores vans run from central Stores Depots, attached to ordinary slow passenger trains, carrying to stations throughout the system, according to area, lamps, brooms, brushes, shunting poles, sponge cloths, dusters and many other items. In one year, 12,350 lamps, 1,000 brooms, 1,120 brushes, 19,480 shunting poles and 181,780 dusters, for example, are issued in exchange for old stores. During 1944 in addition 320 bed covers, 700 blankets, and 550 pillow slips were distributed in connection with fire-watching and similar duties.

New American Locomotive Giants

The Pennsylvania Railroad have placed an order for 50 powerful streamlined multi-cylinder steam locomotives, capable of hauling full-length passenger trains at speeds up to 100 m.p.h., and freight trains on fast schedules. Of these engines 25 will be built by the Baldwin Locomotive Works, and the other 25 engines and 50 tenders will be constructed in the Altoona shops of the railway. The new locomotives will go into service this year and will be known as class "T1." They are the fourth newly-designed type of steam locomotive to be announced recently by the Pennsylvania. The others include a multi-cylinder, heavy duty locomotive, class "A2," now also being built in quantity, a steam turbine locomotive, type "S2," recently completed and placed in test service, and the "Triplex" steam locomotive.

The "T1" locomotives have eight driving wheels, with four-wheel leading and trailing trucks. There are four cylinders, with poppet valves, and each pair will drive two pairs of driving wheels. The tender will carry 41 tons of coal and 19,500 gallons of water. The driving wheels are 6 ft. 8 in. in diameter, steam pressure is 300 lb. per sq. in. and the starting tractive effort is 64,650 lb. The total weight of engine and tender is over 415 tons, and the overall length is approximately 123 ft.



A King's Cross-Leeds express in 1927, with "A1" 4-6-2 No. 2559 "The Tetrarch" at its head. The signals shown are of the G.N. somersault type. Photograph by F. R. Hebron.

How Cider is Made

MANY a merry ballad, matched to a lilting memorable tune, has been sung in praise of cider and the traditional west-countryman's fare that goes with it—a "doorstep" of farm-baked bread and a wedge of dairymade cheese. Prose wroters, too, have not been backward in commending it; as far back as in Elizabeth's day, Francis Bacon was writing in his *New Atlantis*: "We had a kind of cider made of a fruit of that country; a wonderful pleasing and refreshing drink." There is special significance in his qualification "a *kind* of cider" and the mention of *fruit*, for in Bacon's time, and even later, the general term "cider" could denote almost any kind of potent drink, with the exception of wine. If, as the context suggests, Bacon was really alluding to the fermented juice of the apple, the great Lord Chancellor was delivering a judgment which generations of future workers and wayfarers were destined to ratify. Watch how the reaper, at the mid-morning break in the harvest field, wags an approving head at his half-drained mug of "home brewed"; the gesture is as conclusive as a law lord's "I concur."

Through the centuries, however, cider has undergone some fluctuation in popularity. During the seventeenth, eighteenth and the early part of the nineteenth centuries, the cider-making trade was very prosperous. Then for a time cider drinking lost favour with the public and did not regain it until a mere fifty years ago. Since then its popularity has become firmly re-established, and the methods of making it have been greatly improved.

The apple which is most used in the manufacture of cider is a special type of the bitter-sweet variety; in many cases the term "Norman" forms part of its name classification, indicating that the original tree was of French origin. To-day, however, English grown apples are mainly used; indeed, some of the cider-making firms in Herefordshire, Somerset, Worcestershire and Devon provide the farmers with their trees in the first place and plant them at a small cost, to ensure that they obtain precisely that fruit which will produce the desired quality of cider. When there is a poor crop, as sometimes happens owing to the vagaries of the climate, especially when late frosts prevail, French apples are imported to make up the tonnage required. Occasionally certain types of cooking apples are added to the cider apples to supplement the crop.

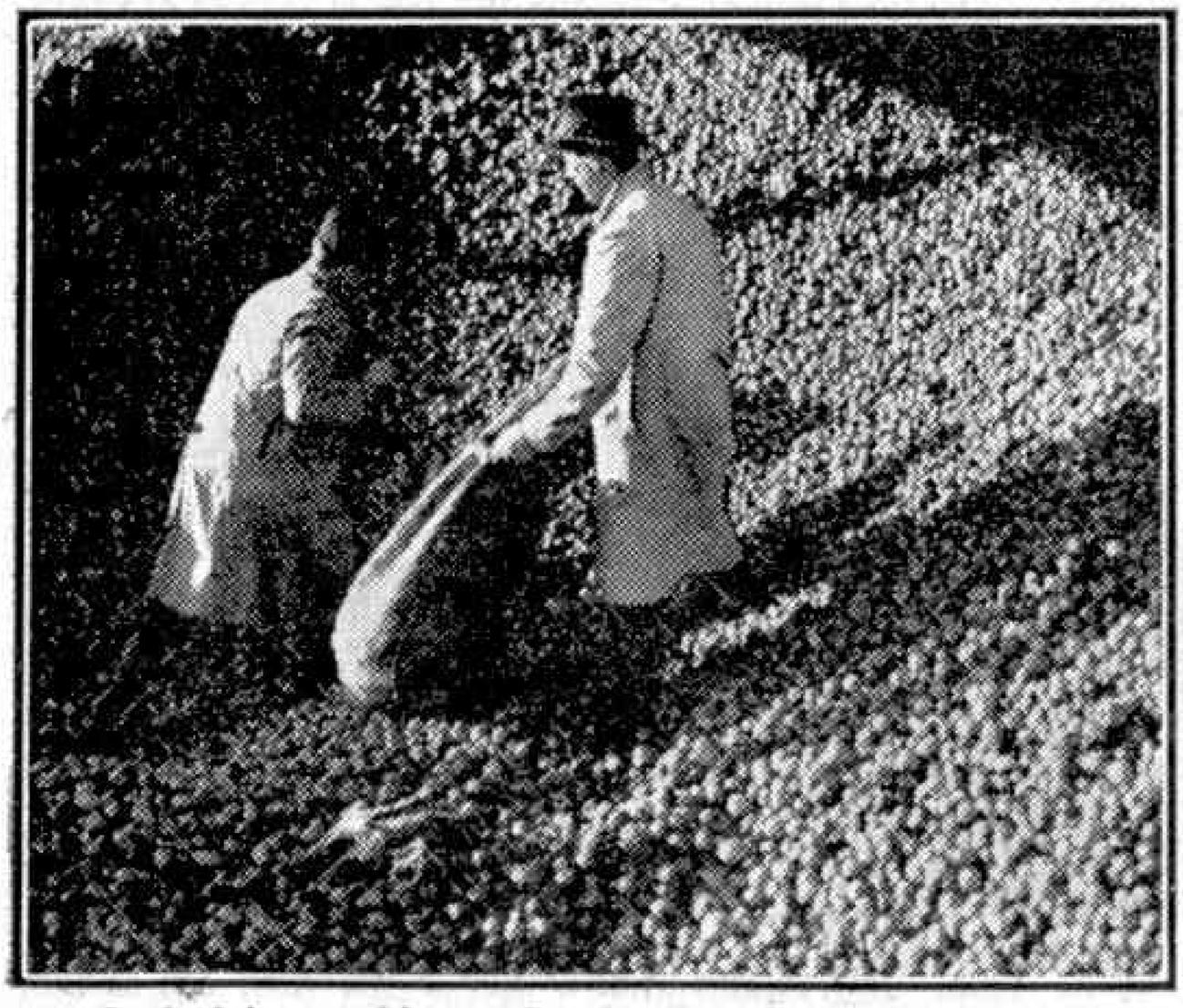
A cider orchard in blossom. Photographs by courtesy of H. P. Bulmer and Co. Ltd., Hereford.

Cider apples are very attractive in appearance, being mostly of a bright red colour, but are distinctly unpleasant to the taste. They must possess certain special characteristics, among the most important of which are low acidity and high astringency.

The quality of the cider is largely dependent upon the weather experienced during the blossoming, fertilising, and maturing periods of the apple. For example, cider made during a hot summer is usually of a very high quality and has an added natural sweetness. To minimise the fluctuation in quality through varying climatic conditions, cider manufacturers employ a number of corrective processes, devised by laboratory research and adaptable to the conditions of the current season.

Let us make a tour of a factory and see for ourselves the process of manufacture, from the arrival of the raw apples to the finished products—draught and bottled cider. The apples arrive in bags by rail or road and are weighed, then discharged from the bags and thoroughly washed by water at high pressure. The house where the washing is performed is so constructed that channels in the concrete floor allow the waste earth and sand to pass out, while the apples float on to a trough or canal at the base of an elevator leading to the crushing plant. This elevator has perforated buckets, from which the water drains away as the apples are being transported to the crushing plant.

The next process is the extraction of the juice. The apples are raised from the washing trough to the mill, where they are chopped into small fragments. Next they pass to the presses, which are either of the



Bathed in sunshine and ankle-deep in cider apples.

Filled flagons passing to the machine that fixes the stopper-straps.

hand or hydraulic variety. In the former the bed of the press somewhat resembles a billiard table in size and form; in the places where the pockets would normally be there are pipes which carry the apple juice to the storage vats. The apple pulp, or "pomace," is spread on the bed of the press to a depth of six to nine inches—on one half of the press only. On the pomace is laid a slatted frame; another stratum of pomace is added, followed by another frame, and so on until the apple pulp is built up to a height of some four feet. It is now ready for pressure, which is applied rapidly at first, then more slowly. The head of the press descends, squeezes the mass, the apple juice flows through the pipes into glass-lined tanks, and is then pumped through enamelled mains to the storage vat.

It was noted earlier that only half of the press bed is used at a time, while the first section is being pressed the second section is being prepared for treatment, this method ensuring that the presses are continually at work.

The juice, or "apple-jack" as it is now termed, having been expressed, the residue of pith is taken from the press and dried, after which it resembles brewers' grain. This residue is not wasted; it goes to pectin manufacturers, who use it as the basis of the well-known product for stiffening jams; the dried product is also used for animal feeding.

The next stage of the process is fermentation. This commences immediately the juice is expressed and normally takes about three weeks. The resultant product contains something in the region of 5 per cent. alcohol. After fermenting, the cider has a cloudy appearance caused by the presence of impurities, which are separated when it is refined.

The refining process is carried out by a battery of cellulose fibre mat filters, through which the cider is passed at a very low pressure. After each batch of cider has been filtered, the mats are broken up, washed, and reformed for further use. This is a daily practice throughout the cider making season. The cider is then subjected to a second filtering by the same process, and passed to the storage vats until it is required for blending. These vats look like gigantic hogsheads, and are capable of holding from 30,000 to 100,000 gallons each. They are constructed either of oak staves, shaped in the same way as a barrel, or of cement with a glass inner lining.

It is interesting to note that once the juice has been squeezed out of the apples by the presses it does not come into contact with any kind of metal. The mains through which it passes are enamel, the vats are either wooden or glass-lined, and the taps for drawing the cider are made of either wood or porcelain.

The cider is drawn from the storage vats as required and pumped into the blending vats; from these it is poured into the casks by automatic fillers which cut off the supply as soon as the casks are full. The full casks are then "pitched"—in other words, a sweetening agent is added, together with a special yeast which imparts a sparkle to the cider. This done, the casks are closed and stored in a warm warehouse for the cider to mature before despatch.

From the modern cider factory three descriptions of cider are despatched; conditioned cider for draught consumption, carbonated cider in casks for other firms to bottle, and sparkling cider which is bottled at the factory.

The introduction of carbon-dioxide gas is the last operation before the cider is bottled. The cider is drawn from the storage vats, re-filtered and chilled to freezing point (32 degrees Fahrenheit), and passed in the cool state to jacketed cool tanks where the low temperature is maintained. The carbon-dioxide gas is put in from pressure cylinders, a process taking from six to eight hours. The gas is two and a half times the volume of the cider.

The cool carbonated cider is then ready for bottling and passes through enamel pipes to a rotary filling machine. Previously cleansed bottles are passed by conveyor to the filling machine, and are lifted and held by air pressure against the filling nozzle. The tap which regulates the flow of the cider is controlled by the cam operating on a projection; as the bottle is raised against the nozzle the tap opens to admit, first, the compressed gas and then cider under pressure. When the bottle is full, the tap automatically closes; the bottle is removed by conveyor and stoppered by machinery.

Cases of cider being loaded for despatch by rail.

After bottling, the extreme chill of the cider needs to be tempered, or condensation on the outside of the bottles, especially in warmer weather, would impair the immaculate condition of the labels. The bottles are therefore *(Continued on page 178)*

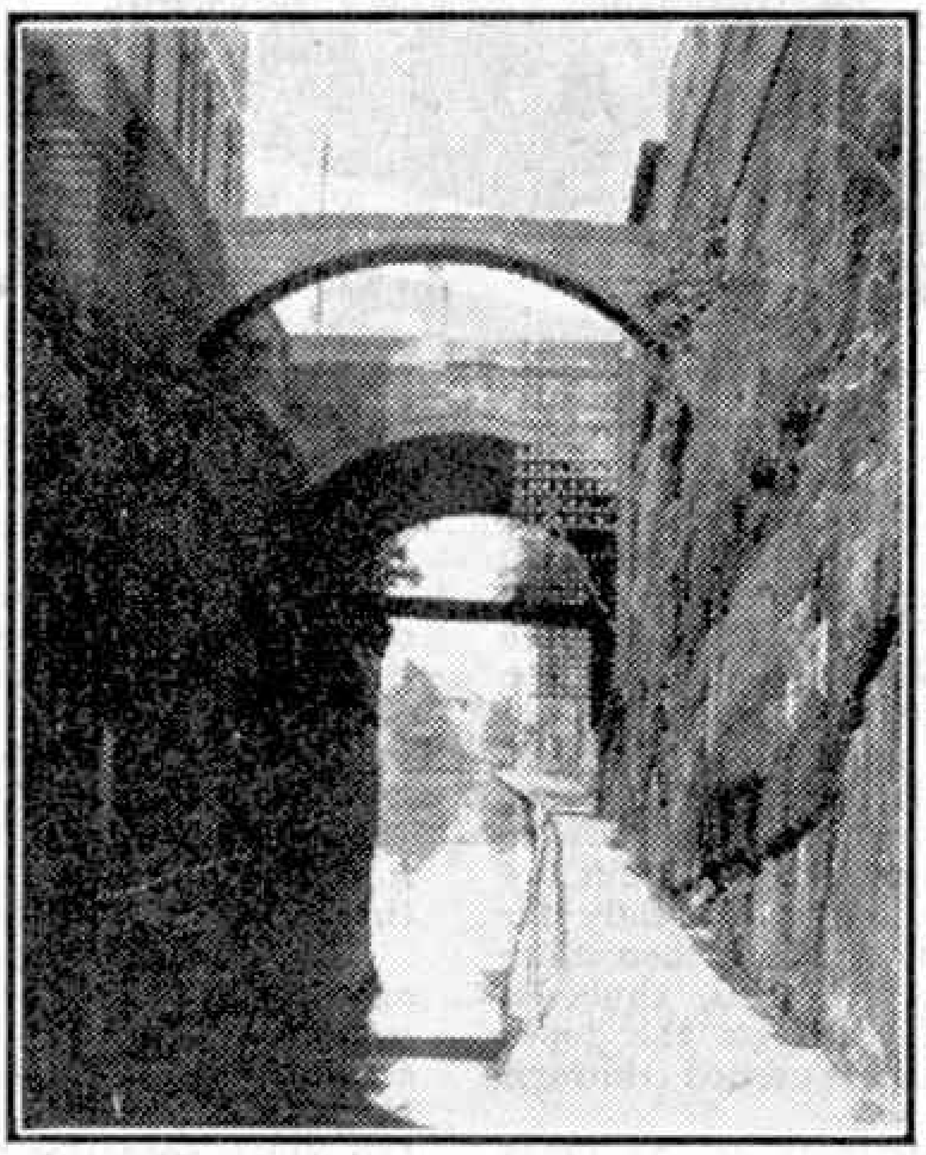
From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

CHESTER'S BRIDGE OF SIGHS

A picturesque survival of Old Chester is the Bridge of Sighs, which spans a cutting that once was part of the city's defences, but is now occupied by the canal. This is the nearer of the two bridges shown in the accompanying illustration. It is a relic of the days when the City Gaol stood on the Old Northgate, from which condemned prisoners were taken to the church of Little St. John across the ravine, just prior to execution. On this journey the main bridge seen just beyond the Bridge of Sighs in the photograph had to be used. This bridge carried the public street across the ravine and rescue of the prisoners was often attempted in the street. To avoid this the Bridge of Sighs, giving direct communication with the church, was erected in 1793 at a cost of £20. Formerly there were iron railings on each side of the bridge, but these were removed some years ago.

R. RAWLINSON
(Whaley Bridge).



The Bridge of Sighs, Chester, with a road bridge beyond it. Photograph by R. Rawlinson, Whaley Bridge.

AN INTERESTING MILL

Little Laver, which is about five miles from Ongar and nine from Great Dunmow, has one of the most interesting mills in Essex. This has been over 200 years in the possession of the same family. Originally it was a post mill, carried on a post and turned as required to suit the wind, but the grandfather of the present owner had the brilliant idea of taking the roundhouse up another storey. This was effected by means of props and jacks. Very gradually the mill was hoisted on to a curb of brick under the original roundhouse. It now works on the principle of the cap-tower mill, that is one in which the sails are carried on a part that rotates on a tower, and in addition there is room to store 200 quarters of grain in the roundhouse besides what can be placed in the timber mill above it.

There are four pairs of stones. Two pairs are worked from the brake wheel, one pair from the tail wheel, and the fourth pair from a steam engine in the roundhouse. The mill worked until recently grinding meal for farm use. The sails are all single shuttered, and the fantail, which is dilapidated, has gearing running down to the curb on top of the semi-tower.

W. D. NEEDHAM (Writtle).

Little Laver Mill, Essex. Photograph by W. D. Needham, Writtle.

HISTORIC AUSTRALIAN RELICS

At Macquarie Place, Sydney, in almost the identical spot where, in January 1788, Captain Arthur Phillip made his "landing," is the anchor of H.M.S. "*Sirius*," flagship of the famous "First Fleet" from which the landing was made. This anchor, with its wooden stock, was recovered off the coast of Norfolk Island, where in 1790 the "*Sirius*" was wrecked. It lay in the shallow water near the Island for over 100 years before being raised in 1906, when it was sent to Sydney and presented to the Australian Government.

The memorial is set in white marble on a bluestone base, and was unveiled on 26th January 1907, 119 years after the founding of the colony of New South Wales. The inscription on it reads: "*This anchor belonged to H.M.S. 'Sirius,' which convoyed the First Fleet, sailed from the Isle of Wight, 13th May, 1788, and was wrecked 19th March, 1790, at Point Ross, Norfolk Island, whence this anchor was recovered through the efforts of Sir F. Suttor (eminent Australian Historian). Erected 1907.*"

The "*Sirius*" was built as an East Indiaman in 1780, and then named the "*Berwick.*" The name was changed when the vessel was commissioned under Captain Phillip and became "guard ship" to the famous "First Fleet." She was of 612 tons burden and carried 10 guns, though all but two were stowed away to make room for cattle stalls when she called at Cape Town on her voyage to Australia. The ship then had on board 10 civil officers, 212 marines, with 28 wives and 17 children, 81 free settlers and 504 male and 192 female convicts.

In 1790 the "*Sirius*" was sent to Norfolk Island near by to relieve the hardships of the Colony. As she neared the Island heavy weather developed and she was driven on the rocks. Passengers and crew were saved, but their effects and the cargo were lost.

Adjacent to the anchor in Macquarie Place is a quaint nine-pounder cannon, formerly part of the armament of the "*Sirius.*" For many years this was stationed at South Head, at the entrance to Sydney Harbour, for signalling purposes, and was removed to its present position in 1907.

K. ALLEN (Oatley, N.S.W.)

Photography

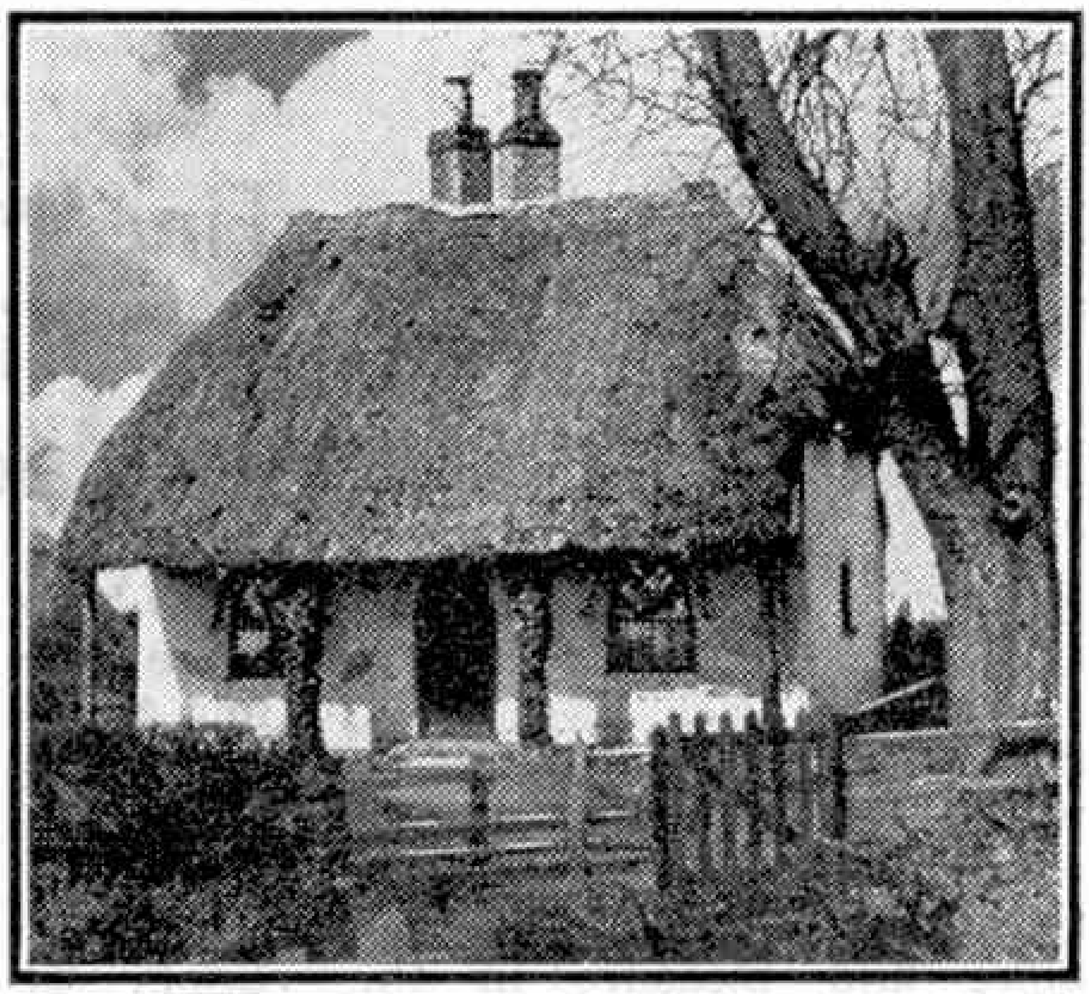
Thatched Cottages

By E. E. Steele

AMONG the many interesting things fast disappearing from our countryside are the thatched cottages, the pride of our grandfather's and great-grandfather's day. Each year seems to bring about the ruin of more of these picturesque old dwellings, and the only way we have of preserving something of their charm is by taking pictures of them.

The thatched cottage, tucked away in some delightful old corner of the village, has been the inspiration of many an expert photographer before to-day, and will continue to be while there are any of them remaining, although their day is rapidly passing.

I have spent many an interesting day cycling round the country lanes in search of these ancient dwellings. Not all are suitable subjects for picture making. Some are surrounded by high hedges or trees which make it almost impossible to obtain a worth-while photograph, but many are accessible and in good positions for camera work.



A thatched cottage of unusual design.

Typical village thatched cottage.

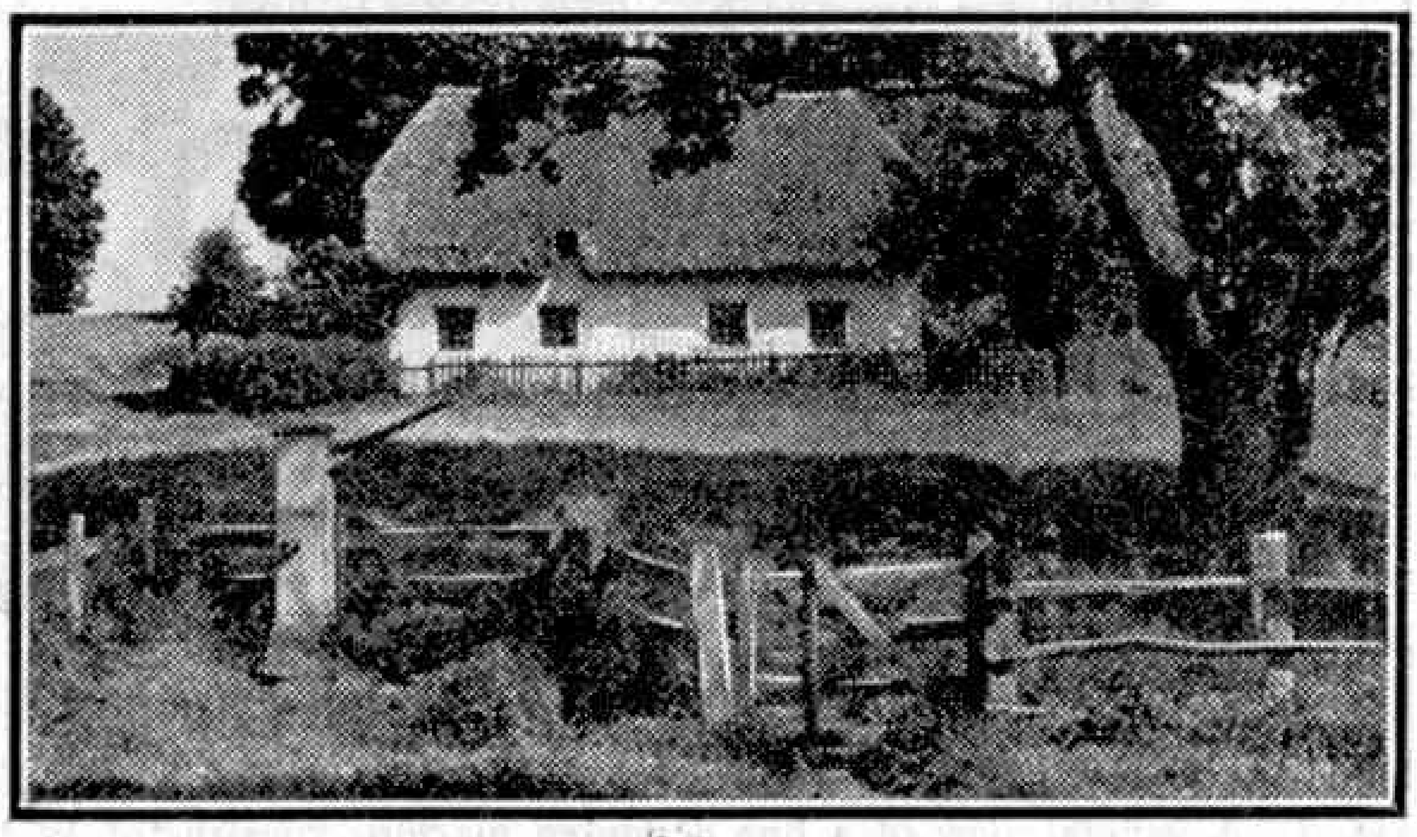
It does not much matter which kind of camera is used, but it matters a great deal what kind of lighting you use. Perhaps the worst is brilliant, glaring sunshine falling directly on the white walls. This will make it impossible to obtain any tone in the walls, and the sfrong shadows may combine to make your picture all "soot and whitewash." A much softer lighting, as when the sun is shining behind light clouds thereby causing diffusion, is to be recommended. A good test is to note when your body is casting just a faint shadow.

This kind of lighting, coming from one side and not from behind you, will give you ideal conditions, and help you to get a good rendering of the texture of the walls. For those who develop their own negatives it is good advice to give a rather full exposure, and then cut down the developing time a little in order to obtain a soft negative, full of detail.

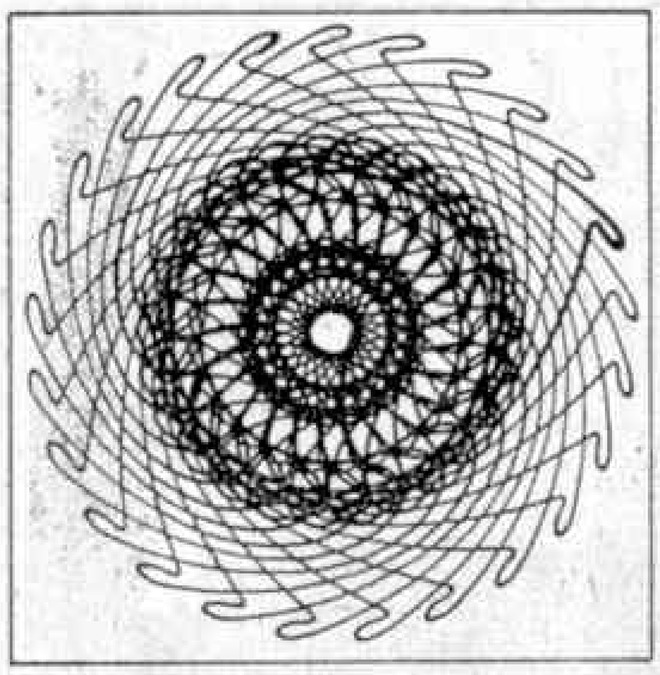
Not all thatched cottages are of the same pattern, and much of their charm lies in the odd ways in which they have been built, not like the rows of houses all exactly alike with which we are more familiar. My favourite thatched cottage was discovered at an out-of-the-way spot called Langton, and is unlike any other I have seen. Even the chimneys are set at a queer crooked angle, and the roof is continued over the front, supported by two ivy-covered posts, making a kind of awning which must provide a delightful shade on hot summer days, and afford protection from cold winds in winter. The curious leaded window-panes also are interesting.

I came across this cottage quite by accident while cycling only a few miles from home, which proves that hunting thatched cottages with a camera can be quite an exciting matter, and a fine way of spending a holiday. Why not explore your county for thatched cottages and make pictures of them? Such pictures will grow in value and interest as years go by and these cottages fall into ruin, or, as frequently happens, are pulled down to make way for road improvements. I only wish I had more of them.

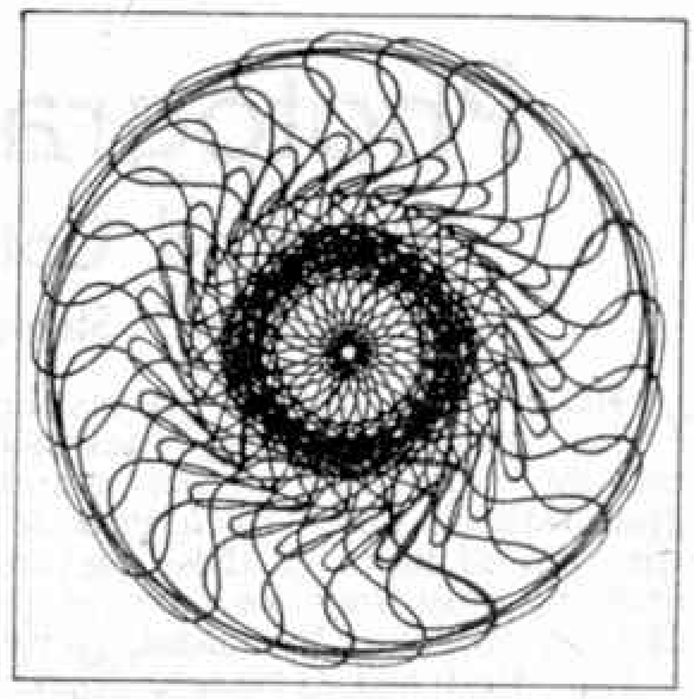
When the war is over, and the new colour films are plentiful, I hope to re-live these happy times in making pictures of these delightful cottages in their natural setting of gardens and flowers.



A cottage in beautiful surroundings.



A Fine Meccano Designing Machine



AMONG the unlimited number of models that Meccano builds it would be difficult to name one that has attracted more interest and attention than the Meccanograph. Young and old alike find pleasure in the variety of beautiful designs that can be produced with the machine, which, as most *"M.M."* readers will know, is a device that draws on paper pinned to a rotating table a wide range of fascinating designs of the kind shown at the top of this page. The form of the design produced can be varied merely by making simple adjustments to the operating mechanism.

Designing machines of this kind can be built in many different ways, but they are all based on similar principles. Their main feature is a mechanically operated arm that carries a pencil or a pen and moves in two different directions over a sheet of paper fixed to a rotating table.

One of the best machines that has come to our notice is the fine model shown in Fig. 1 on this page. This was built by the Rev. W. B. Hume, Tunbridge Wells, some time ago, and while it has some of the features of the standard Meccanograph it is much more elaborate and contains original constructional ideas that make possible the production of a rather wider range of designs.

In Mr. Hume's model the design is drawn by a fountain pen fixed at the end of the pivoted pen arm 1 that is capable of both side to side and to and fro movements, either singly or combined. The pen traces the designs on a sheet of paper pinned to the rotating table 2, which, together with the mechanisms that operate the pen arm is driven by a motor 3. In the illustration the model is shown fitted with a gramophone motor, but originally an Electric Motor was used until it was required for other models.

Variety in the designs is produced by altering the speed and extent of the two movements of the pen arm relative to

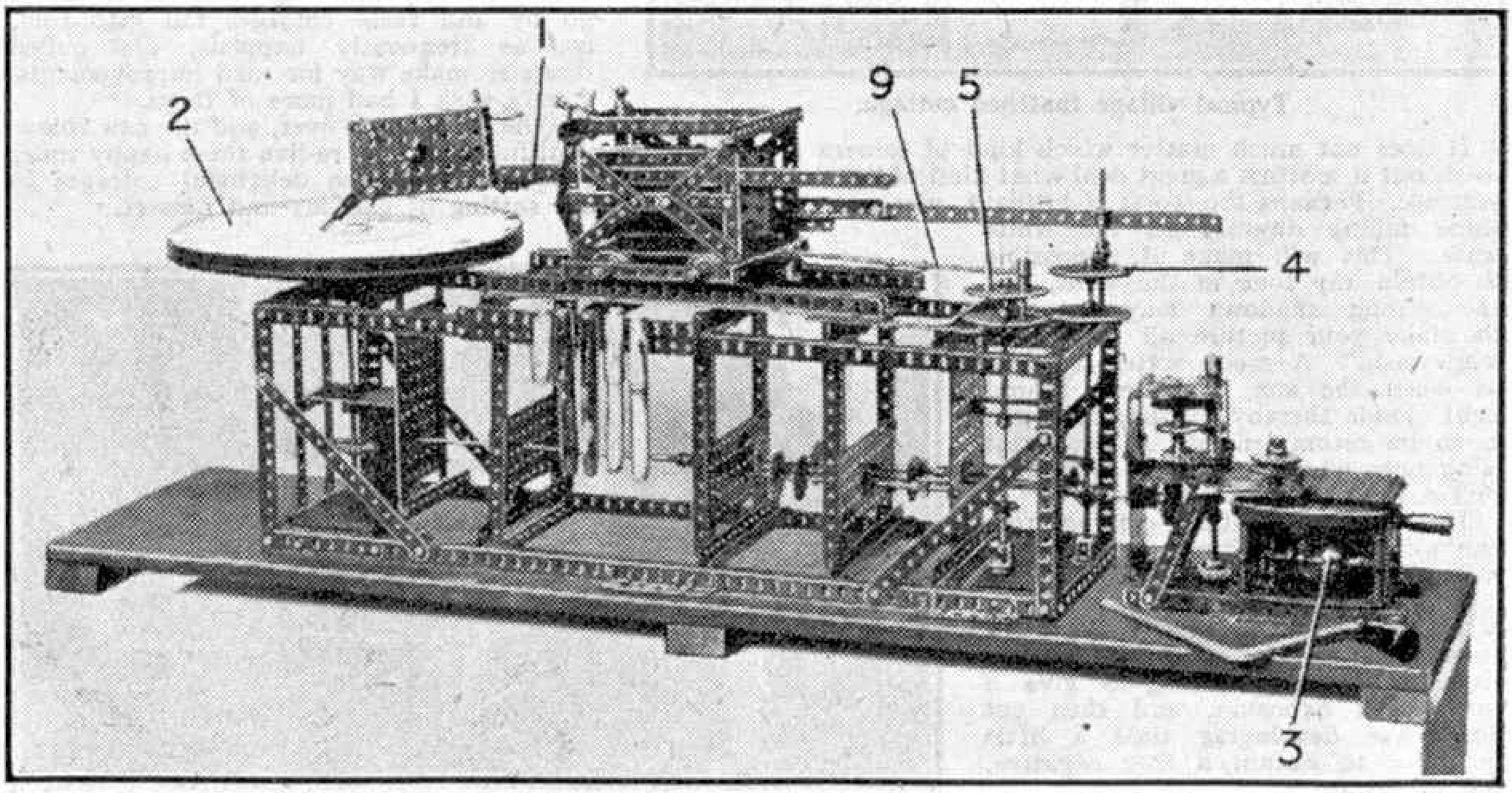


Fig. 1. A general view of a fine designing machine constructed by the Rev. W. B. Hume, Tunbridge Wells. Two of the many different designs that can be produced with it are shown at the top of this page.

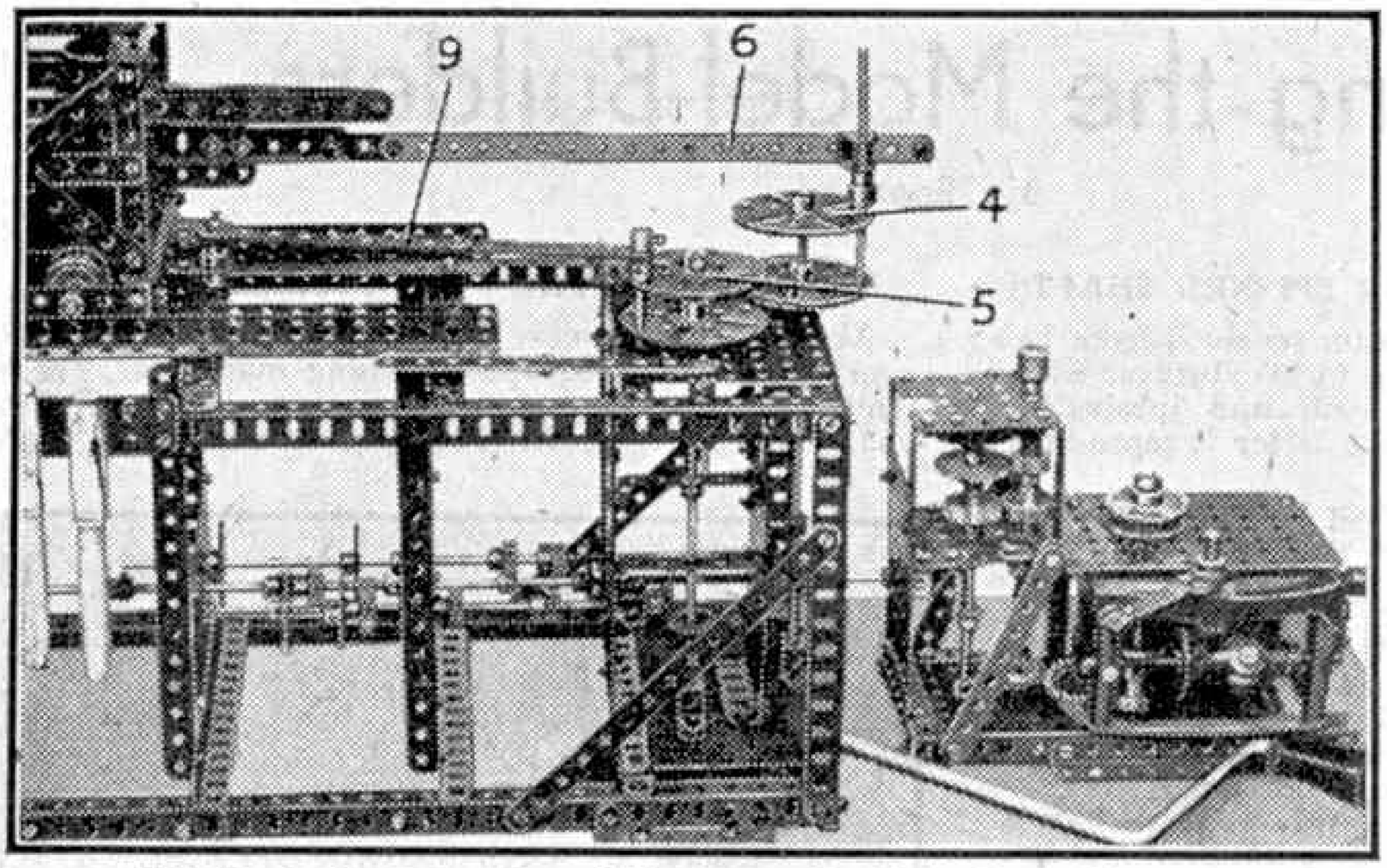


Fig. 2. A close up view of the crown heads and gear-box.

each other and to the speed of rotation of the table. These alterations are effected by employing alternative gear ratios in the drives to the table and the shafts that operate the pen arm and its carriage, and also by varying the point at which the pen arm is pivoted.

The pen arm 1 is carried backward and forward along the machine on a travelling carriage, which runs on the edges of Angle Girders. This carriage is linked by means of a $5\frac{1}{2}$" or $7\frac{1}{2}$" Strip 9 to a crown head 5, which consists of two Face Plates bolted back to back and mounted on a vertical rod, which can be rotated at various speeds. The side to side or lateral movement of the pen arm is produced by a second crown head 4, also made up from two Face Plates. This head carries, in any one of its 16 holes, a short Rod fitted with an Eye Piece, through which slides a well greased Strip 6 that forms an oscillating arm and is connected to an oscillating box 7 Fig. 3, which in turn carries the pen arm 1 This oscillating box consists of two Flanged Plates, pivoted vertically inside the carriage as shown. It is possible to pivot the oscillating arm and its box in three different positions.

The pen arm 1 consists of Strips, and these slide in Eye Pieces fixed to the sides of the oscillating box so that the length of the arm can be varied. The Strips are drawn together at their rear ends by means of a long Bolt and nut.

When the crown head 4 rotates, the Rod in one of its holes is carried around, and so causes the oscillating box to swing on its vertical axis.

The pen holder consists of two $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flat Plates spaced apart by Double Brackets at their rear ends, but free to grip the pen between their front ends.

By means of the gear trains provided in the gear-box at the rear end of the machine, it is possible to arrange 25 different speed ratios which, in conjunction with variations of the pivot position of the oscillating arm and length of the pen arm account for the wide variety of designs it is possible to produce.

We are aware that many *"M.M."* readers have constructed designing machines based on their own ideas, and we shall be glad to hear from any who have experimented with devices of this kind and to receive photographs and details of their models. In addition to photographs of the machine itself designs produced on it should also be sent.

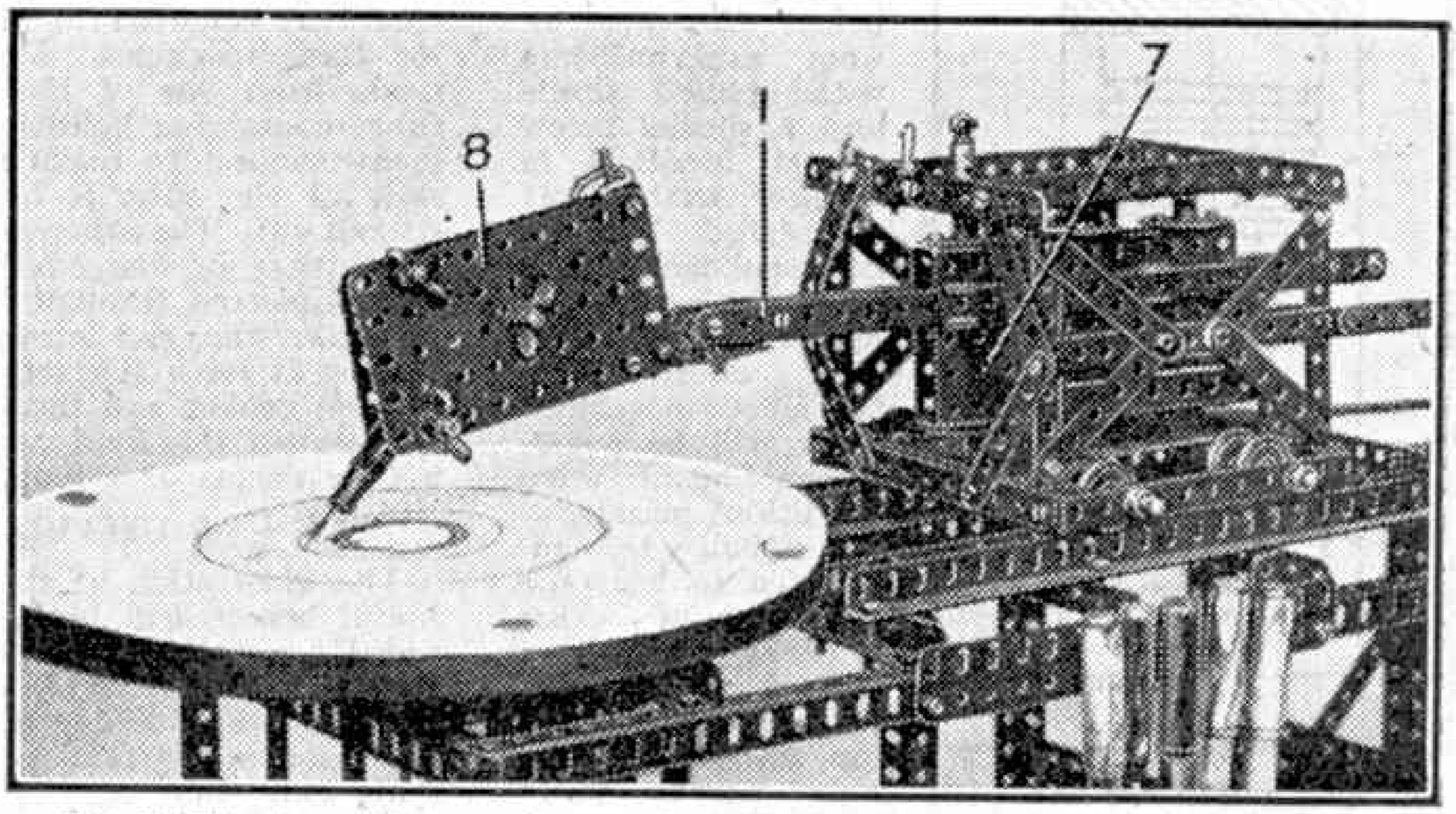


Fig. 3. The travelling carriage and oscillating box that carries the pen arm.

Among the Model-Builders

By "Spanner"

MODEL-BUILDERS ASK FOR SPLINED SHAFTS

Here is an extract from a letter received from two very keen model-builders living in Weybridge, which I think other model-builders will find interesting. A drawing that accompanied the letter is reproduced on this page.

"We noticed in one of your publications that suggestions for new parts are welcomed. We have an idea which we believe to be original. We have found a need when making Meccano gear-boxes, drive-changing mechanisms, etc., for a splined axle shaft. We do not regard it as a part that is essential, but we think that it would greatly enhance the interest of Meccano and allow even more compact and more realistic mechanisms to be made.

"Here are our suggestions for how it should be made and used. The rod would be a standard Meccano Axle Rod, but it would have a single keyway or spline of rectangular or semi-circular cross-section cut into it. There should be 8½", 5", 4½", 4", 3" and 2" fully-splined axles, and 11½" and 8" axles splined for half their length.

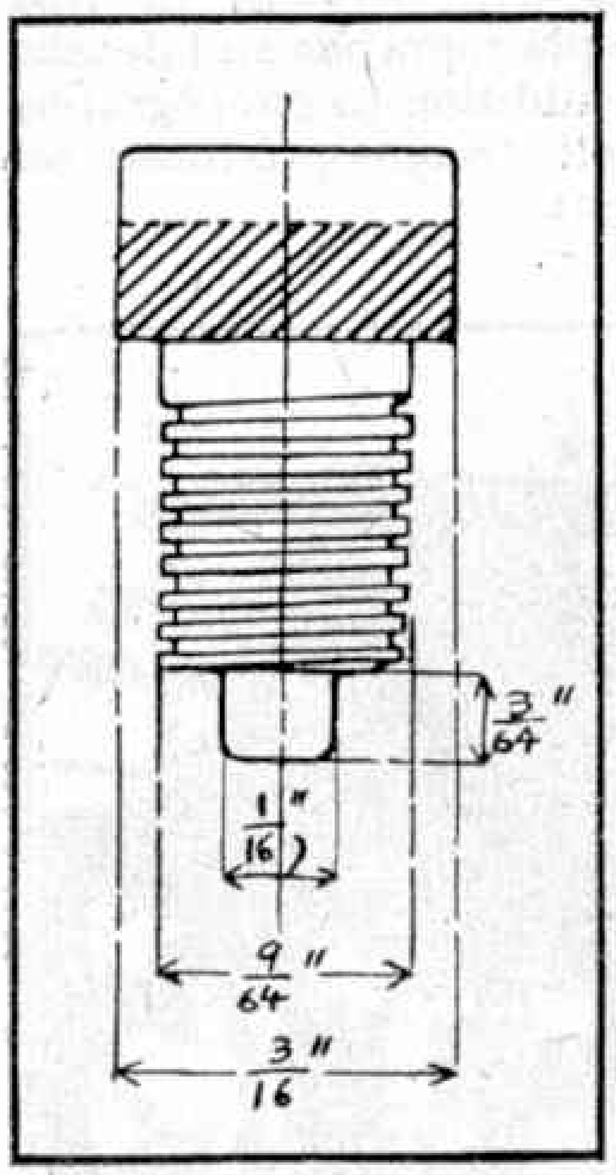
"Gear Wheels and pulleys could be mounted on these shafts with a special bolt, which would be screwed through the boss of the wheel or pulley and into the keyway. The bolt would be of such a length that it would not actually grip the axle but would give positive drive and also allow the gear or pulley to slide along the Rod.

"We also suggest a splined socket, which would enable one to slide a wheel or cog attached to it by means of a lever.

"Rods and bolts of this kind would also be useful in preventing wheels from slipping when carrying heavy loads.—R. P. EDWARDS and C. B. SMITH; Weybridge."

I welcome these suggestions and appreciate the trouble these boys went to in preparing and sending me details of their ideas. Their scheme is not original, however, as splined shafts are used in actual engineering. Also keyed parts were included in some of the earliest Meccano Outfits, although they were then intended for a purpose different from that outlined above. Just before the war we were experimenting with splined shafts and a special screw almost identical in design with that suggested by my correspondents, but the outbreak of hostilities prevented their addition to the Meccano system. They will be reconsidered again when conditions permit.

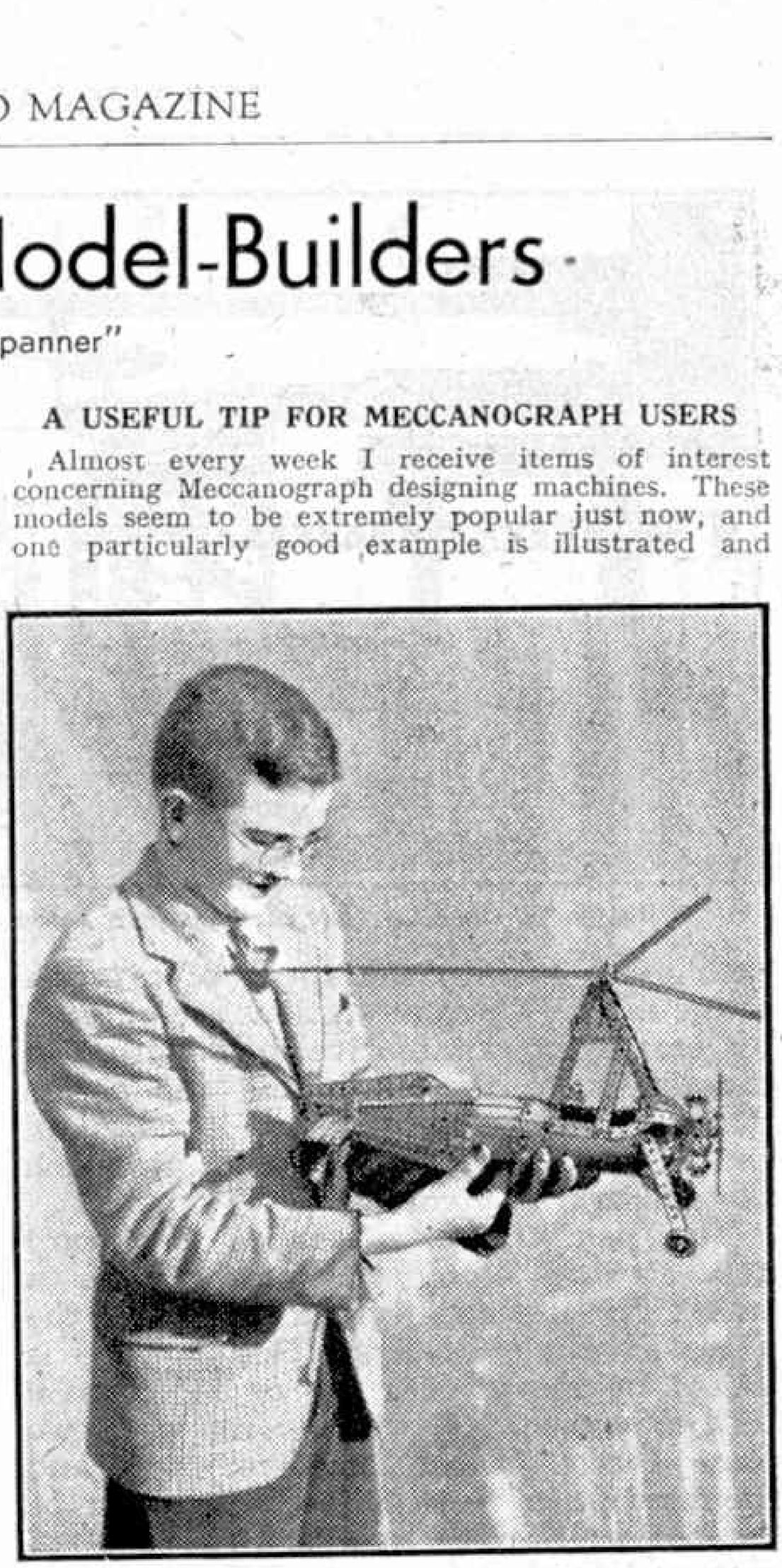
I shall be interested to hear the opinions of other readers regarding splined shafts, and to receive suggestions for other kinds of new parts that readers think would be useful.



The special bolt for use with splined shafts as suggested on this page.

A USEFUL TIP FOR MECCANOGRAPH USERS

Almost every week I receive items of interest concerning Meccanograph designing machines. These models seem to be extremely popular just now, and one particularly good example is illustrated and described on pages 164 and 165 of this issue. It will no doubt receive much attention from model-builders.



John K. Friend, Peebles, is an enthusiastic Meccano model-builder and is seen here with his model of the Cierva C-40 Autogiro, for which he won a prize in a recent "M.M." competition.

Now Jason Williams, Cardiff, informs me of a novel idea that occurred to him regarding a suitable pen for these machines. He says he uses a glass pen made from one of the small torpedo-shaped glass tubes containing lighter petrol, which are on sale at many shops. To make the pen, one of the pointed ends of the tube is broken off and the petrol is shaken out. The other end of the tube is then rubbed on a piece of fine emery paper until a very small hole is pierced through it. Then it is only necessary to make the end nicely rounded and smooth by holding it for a few seconds over a gas flame of the kitchen cooker and the pen is ready for use.

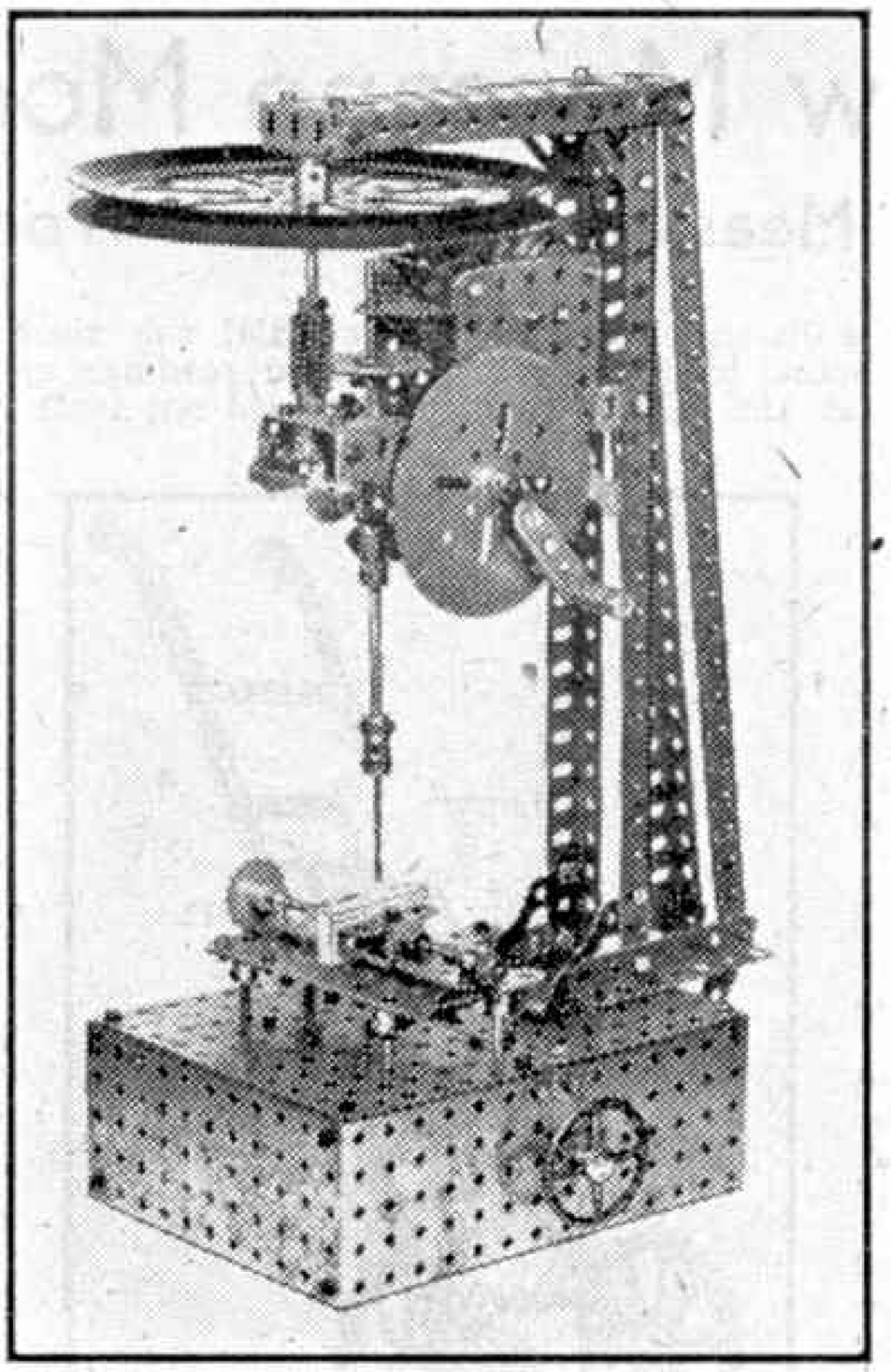
A pen of this kind can be filled with any coloured ink by means of a fountain pen filler.

A USEFUL BENCH DRILL

The illustration at the head of this page shows a useful bench drill built from Meccano parts. I am reproducing this for the special benefit of George Swift, London S.W.15, who wrote to me asking for advice in the building of such a tool that he wanted for his home workshop. The model illustrated was built some time ago by G. Cali Corleo, St. Julians, Malta, G.C., and it is one of the best I have seen. Most of its main details can be seen in the illustration,

and Swift and any others who are interested should have no difficulty in building a similar model for themselves. One of the main points to remember in building a tool of this type is that the supporting column to which the drilling head is attached must be very rigidly constructed. If it is flimsy it will "give" when the drill is fed to the work.

I understand the model illustrated is capable of drilling holes up to $\frac{1}{8}$" dia. in wood and soft metal.



A miniature drilling machine that actually works. It will drill holes up to $\frac{1}{8}$ in. diameter and was built by a Maltese model-builder.

READER'S PROBLEM SOLVED—KNIFE-EDGE BEARINGS

Ronald Matthews, London S.E., wrote for advice in regard to a model weighing balance he intends to build. He tells me that although he has tried several schemes he has not been able to find a satisfactory manner of pivoting the balance beam. Whatever means are adapted it is essential that there shall be as little friction as possible at the fulcrum, otherwise the accuracy of the balance will be affected and it will be impossible to weigh very light articles.

In most actual balances what are known as knife edge pivots are used. Usually these consist of steel or agate prisms, on the apices of which the beam rocks. These can be represented in a Meccano model by Centre Forks, arranged as shown in the lower illustration on this page. Two Centre Forks 1 are secured in a Coupling 2, their points resting between the teeth of two $\frac{1}{2}$" Pinions 3 bolted to a short Rod rigidly held at each end in Cranks 4. The balance beam 5 is secured in the centre hole of the Coupling 2, and it will be noticed that the lever arms 6 and 7 are bolted in Couplings 8 at a lower level than the Coupling 2. The beam is shaped in this way in order to lower the centre of gravity at the fulcrum 1. I think that if Matthews experiments on these lines he will find the solution to his problem.

REGARDING TRAVERSING MECHANISMS

Archie Davies, Cardiff, wrote to me recently regarding a traversing movement that he intended to build into a model planing machine he was constructing. He had tried several schemes but none of them had proved entirely satisfactory, and knowing that it is possible to build almost any kind of mechanism from Meccano he wondered how it was he did not seem to get the right idea. On looking into the matter I discovered that he had overlooked the possibility of the Meccano Threaded Crank (Part No. 62a). The boss of this Crank is threaded internally and this feature makes it a very useful accessory in many ways. I pointed out to Archie that this part provided the answer to his problem and he was delighted. If a Screwed Rod is rotated in the threaded boss of the Crank the Crank is caused to move along the Rod and thus provide a traversing function of the kind Archie required.

Incidentally when fitted with a Threaded Pin at one end the Threaded Crank forms a very useful crank handle, which can be used among other purposes for setting up the tail-stock centre of a model lathe. Handles of this type have many other applications particularly in connection with model machine tools. The Threaded Crank should always be fixed to a Screwed Rod by a nut and not by a set screw, which would cause damage to the thread of the Rod. No doubt there are other readers who have not experimented with the Threaded Crank and I strongly advise them to add one or two to their stock of parts when opportunity permits.

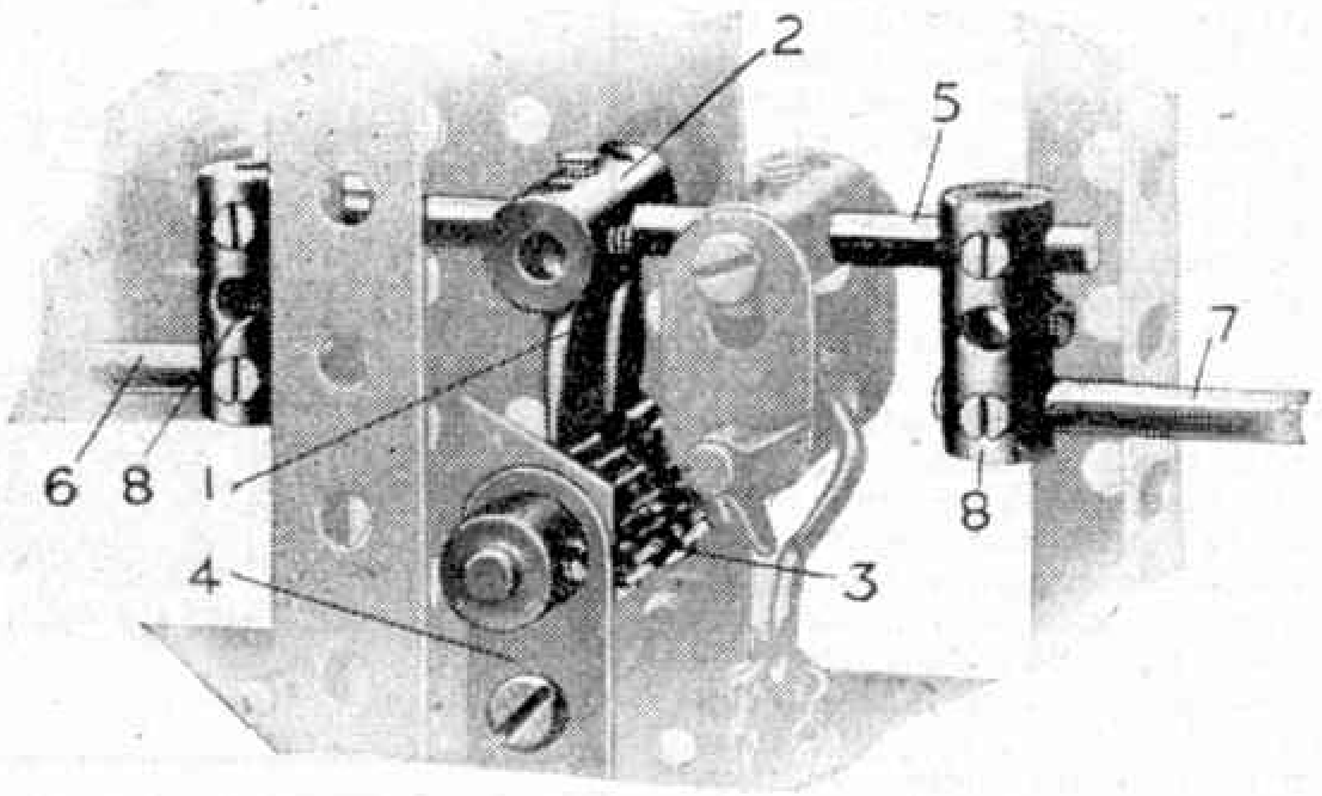
* * * *

Special Note: Some years ago the Editor asked "Pawl," the Meccano office boy, to try his hand at writing an account of his day at the office for the "*M.M.*" The article proved so popular that "Pawl" has never since ceased to pester the Editor for another chance to appear in print, and the Editor has now agreed to publish further short items from "Pawl's" pen in these pages from time to time. These samples of "Pawl's" handiwork will be printed exactly as he writes them, and it is the Editor's hope that they will amuse at least some "*M.M.*" readers.

"PAWL'S KORNER"

"Hello folks. Ear I am again. All merry and brite and lookin forward to 'V' Day so that we can get all the Meccano bits and pieces rolling off the machines again. I am sure you must be waitin for them, espeshshully if you lose as many Nuts and Bolts as I do!

"I was resently made a member of 'Spanner's' model-building staff. I help to build up all those weerd gajets and crazy ideers you chaps send in to us drawn on sugar bags, backs of envelops, and any other old bits of paper you come across! 'Spanner' always builds em up to see if they work or if you are just fooling him! When the models are built I go over em and add the lock-nuts—if any!"



Knife-edge bearings suitable for a Meccano balance.

New Meccano Models

Distance Measuring Machine—Wool Winder

THE model shown in Fig. 1 is a distance measuring machine which is based on actual machines used for measuring distances such as the lengths and widths of fields and golf courses, etc. The machine is merely pushed along and the distance over which it moves is recorded on dials.

The frame of the model is assembled by joining together two 12½" Strips by three 2½" × ½" and one 2½" × 1" Double Angle Bracket 1. Another 2½" × 1" Double Angle Bracket 2 is bolted in the position shown. A 1" × 1" Angle Bracket 3 and a Double Bent Strip 4 are attached to two of the 2½" × ½" Double Angle Strips to provide bearings for the Rods.

Two 3" Wheels are mounted on a 4" Rod journalled in the lower end holes of the 12½" Strips. This Rod carries a ½" Contrate 5 that meshes with a ½" Pinion 6 fixed on one end of a 4½" Rod passed through two of the Double Angle Strips. The Rod carries at its other end a Worm 7, which is spaced from the Double Angle Strip by four Washers.

A 2½" Rod 8, passed through the centre hole of the 2½" × 1" Double Angle Strip and one hole of the 1" × 1" Angle Bracket 3, carries a ½" Pinion 9 that meshes with the Worm, and a Bush Wheel 10 that forms one of the recording dials. A Collar 11 holds the Rod in place, and on its upper end is a coupling fitted with a Centre Fork.

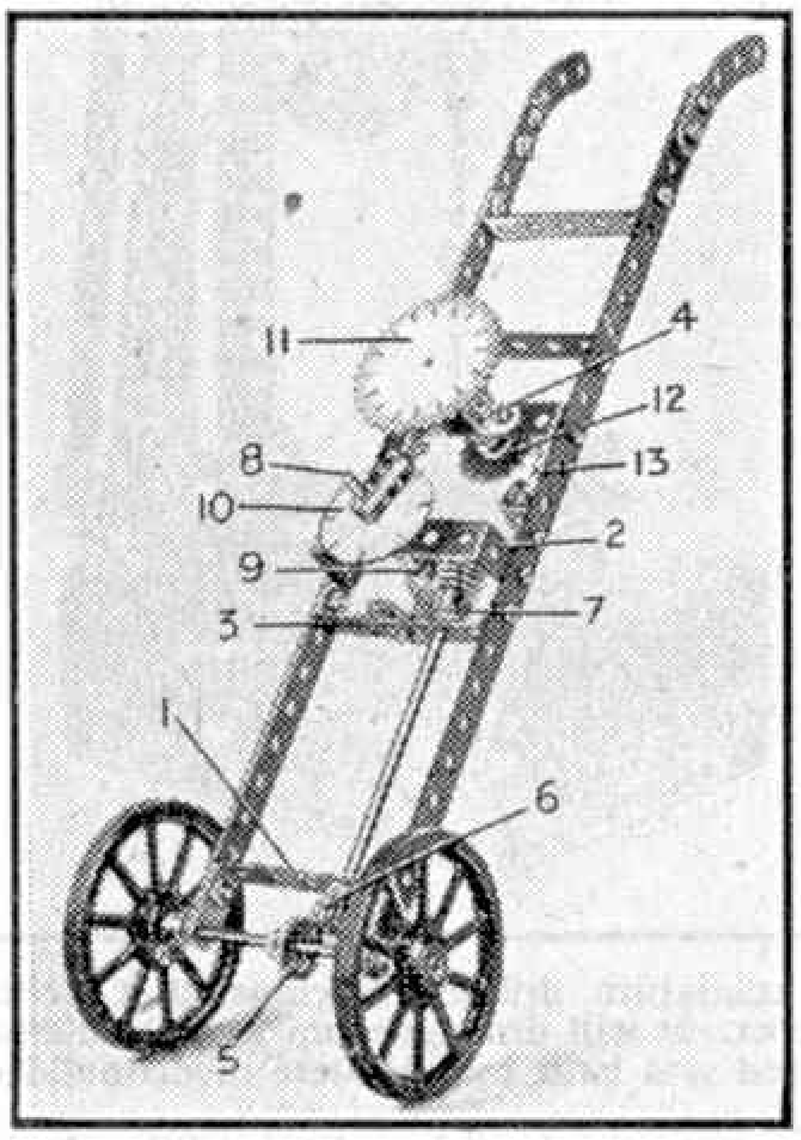


Fig. 1 A model distance measuring machine.

As the Rod 8 rotates when the machine is pushed along the ground, the Centre Fork engages the teeth of a 2" Sprocket 11 fixed on a Rod journalled as shown. On the lower end of this Rod is a 1" Sprocket 12 that serves the purpose of a ratchet. A Pendulum Connection 13, bolted to a ½" × ½" Reversed Angle Bracket fixed to one of the 12½" Strips, is bent to contact the teeth of the 1" Sprocket and form a ratchet brake. Suitably calibrated paper discs should be pasted to the 2" Sprocket and the Bush Wheel.

To calibrate the discs the pointer formed by the Centre Fork should be set central with the 2" Sprocket 11. Then the machine should be pushed along until the pointer has made one complete revolution. The distance the model has been pushed should then be measured with a tape. If this is say 15 ft., the indication is that one complete revolution of the Bush Wheel 10 represents a measurement of 15 ft. The dial can then be inscribed with lines giving desired readings up to 15 ft. As the 2" Sprocket is moved one tooth for every revolution of the Bush Wheel 10, each tooth space represents 15 ft.

In reading the dials the Sprocket dial should be read first, and to the distance indicated should then be added the measurement shown by the Bush Wheel dial.

Parts required to build model Measuring Machine: 2 of No. 1; 1 of No. 12a; 1 of No. 15a; 1 of No. 15b; 1 of No. 16a; 1 of No. 17; 2 of No. 19a; 1 of No. 24; 2 of No. 26; 1 of No. 29; 1 of No. 32; 20 of No. 37a; 20 of No. 37b; 7 of No. 38; 1 of No. 45; 2 of No. 46; 4 of No. 48a; 1 of No. 63; 1 of No. 65; 2 of No. 90; 1 of No. 95; 1 of No. 96; 1 of No. 172.

The base of the model Wool Winder shown in Fig. 2 comprises two 7½" Angle Girders and two 3½" Angle Girders bolted together to form a rectangle. Two 5½" × 3½" Flat Plates overlapped are then bolted to the Girders. At one side of the base are fixed a 4½" × 2½" Flat Plate and a 9½" Angle Girder, and at the other side are an Architrave and a 5½" Angle Girder. The 5½" and the 9½" Girders are bridged by a 4½" Strip. To the Plate are bolted a 2½" × 1" Double Angle Strip and a Double Arm Crank. A Girder Bracket is bolted to the 9½" Angle Girder, and to the Girder Bracket is attached a 3" Strip. A 6½" Rod 1 carrying a ¾" Sprocket is fixed on a Rod journalled in the upper end holes of the 9½" Angle Girder and the 3" Strip.

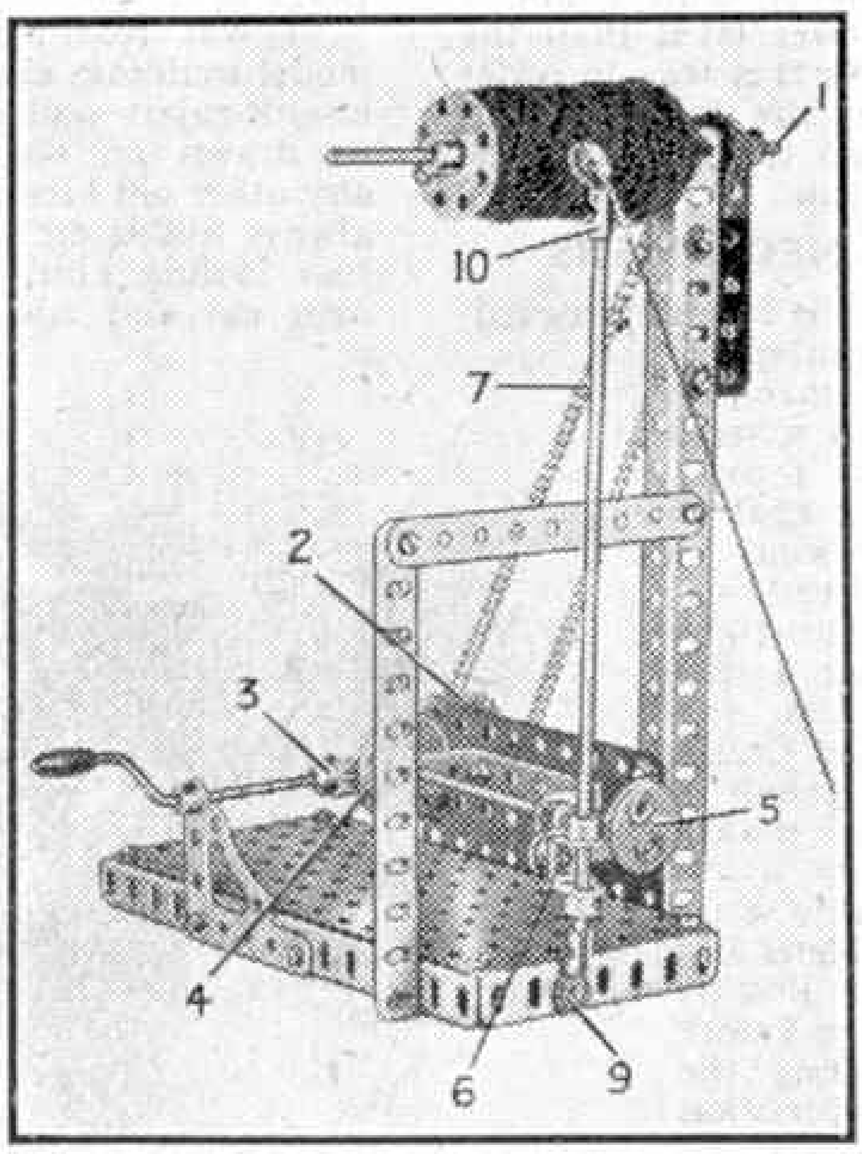


Fig. 2. A useful wool or string winding machine.

A Crank Handle carries a 1½" Sprocket 2 and a ½" Pinion 3 that engages a Contrate 4. The Rod of the Contrate carries also a Single Throw Eccentric 5, the arm of which pivots on a Bolt gripped in a Large Fork Piece 6. The latter is held between Collars on a Rod 7 fixed in Rod and Strip Connector 9. At the upper end of this Rod is a second Rod and Strip Connector 10.

Parts required to build model Wool Winder; 1 of No. 2a; 1 of No. 4; 1 of No. 8a; 2 of No. 8b; 1 of No. 9; 2 of No. 9b; 1 of No. 13a; 1 of No. 14; 1 of No. 19h; 1 of No. 24; 1 of No. 26; 1 of No. 28; 22 of No. 37a; 21 of No. 37b; 4 of No. 38; 1 of No. 46; 2 of No. 52a; 1 of No. 53a; 6 of No. 59; 1 of No. 62b; 1 of No. 94; 1 of No. 95a; 1 of No. 96a; 1 of No. 108; 1 of No. 116; 1 of No. 161; 1 of No. 170; 2 of No. 212.

Model-Building Competitions

By "Spanner"

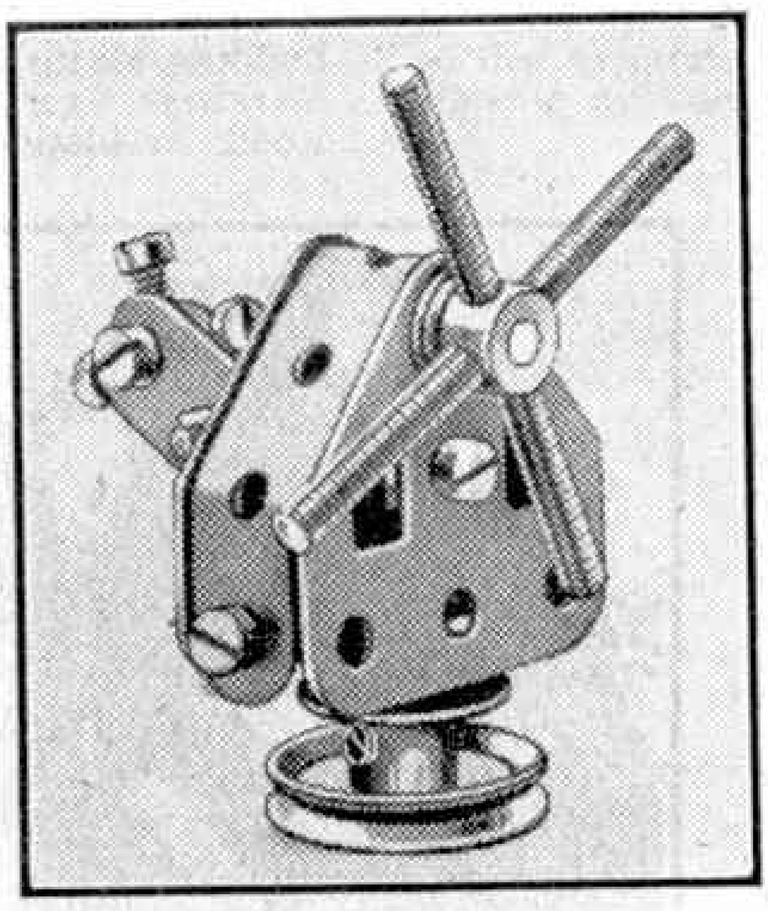
A MECCANO COMPETITION FOR WAR-TIME CONDITIONS

"Simplicity" Competitions are always popular since they give fine opportunities for showing how much originality and realism can be achieved in small models, and they appeal to model-builders who have only limited resources of Meccano parts and are prevented by war-time restrictions from adding to their stocks. A further advantage is that "Simplicity" models lend themselves to simple drawings, a great convenience now that photographs are so hard to get.

This month's Contest therefore takes the form of a "Simplicity" Competition, and fine prizes will be awarded for the most interesting and realistic models received.

For the benefit of readers who are not familiar with the requirements of a "Simplicity" competition we give the following details of the kind of models suitable for entry and the way in which they should be built.

Competitors should first chose an interesting subject and then set to work to reproduce it in Meccano, *using the smallest number of parts that is possible without sacrificing realism.* The top illustration on this page shows a typical "Simplicity" model that won a prize in a previous contest. Any number or variety of parts can be used, but the prizes will go to those who make the best use of the smallest number. Every opportunity of simplifying a model should be taken before finally making a drawing or photograph of it for entry in this contest.



A "Simplicity" model windmill. This is a typical example of the kind of models suitable for entry in the special competition announced on this page.

Photographs or drawings of models should be sent to "*Simplicity Model-Building Competition, Meccano Ltd., Binns Road, Liverpool 13,*" and must be posted in time to reach Liverpool before 30th June. The competitor's age, name and address must be written on the back of each photograph or drawing submitted.

Entries will be divided into two sections. A, for competitors over 12 years of age; B, for competitors under 12. In each Section prizes of £2/2/–; £1/1/– and 10/6 respectively, will be awarded for the best entries in order of merit, and there will be a number of consolation awards of 5/– each for those entries that just fail to win one of the three principal prizes in each Section.

"LIMITED PARTS" CONTEST—PRIZE WINNERS

The "Limited Parts" Contest was confined to models built from a limited range of parts, which were detailed in the January and February issues of the "*M.M.*" The complete list of prize-winners is as follows. *Section A:* 1st Prize, £2/2/–: R. Parkerson, Bungay; 2nd, £1/1/–: J. Alexander, Goole; 3rd, 10/6: J. A. Kennett, Gerrards Cross. *Consolation Prizes of 5/–:* R. Roberts, Birmingham; P. J. Wooster, S. Ruislip. *Section B:* 1st, £2/2/–: M. Bleckwen, Feltham; 2nd, £1/1/–: J. A. Draper, Worcester Park; 3rd, 10/6: J. Cooper, Hounslow. *Consolation Prizes of 5/–:* A. F. Betts, Lemington; D. Gardiner, Bletchley; J. Ambrose, Ely; B. R. Smith, Southend-on-Sea.

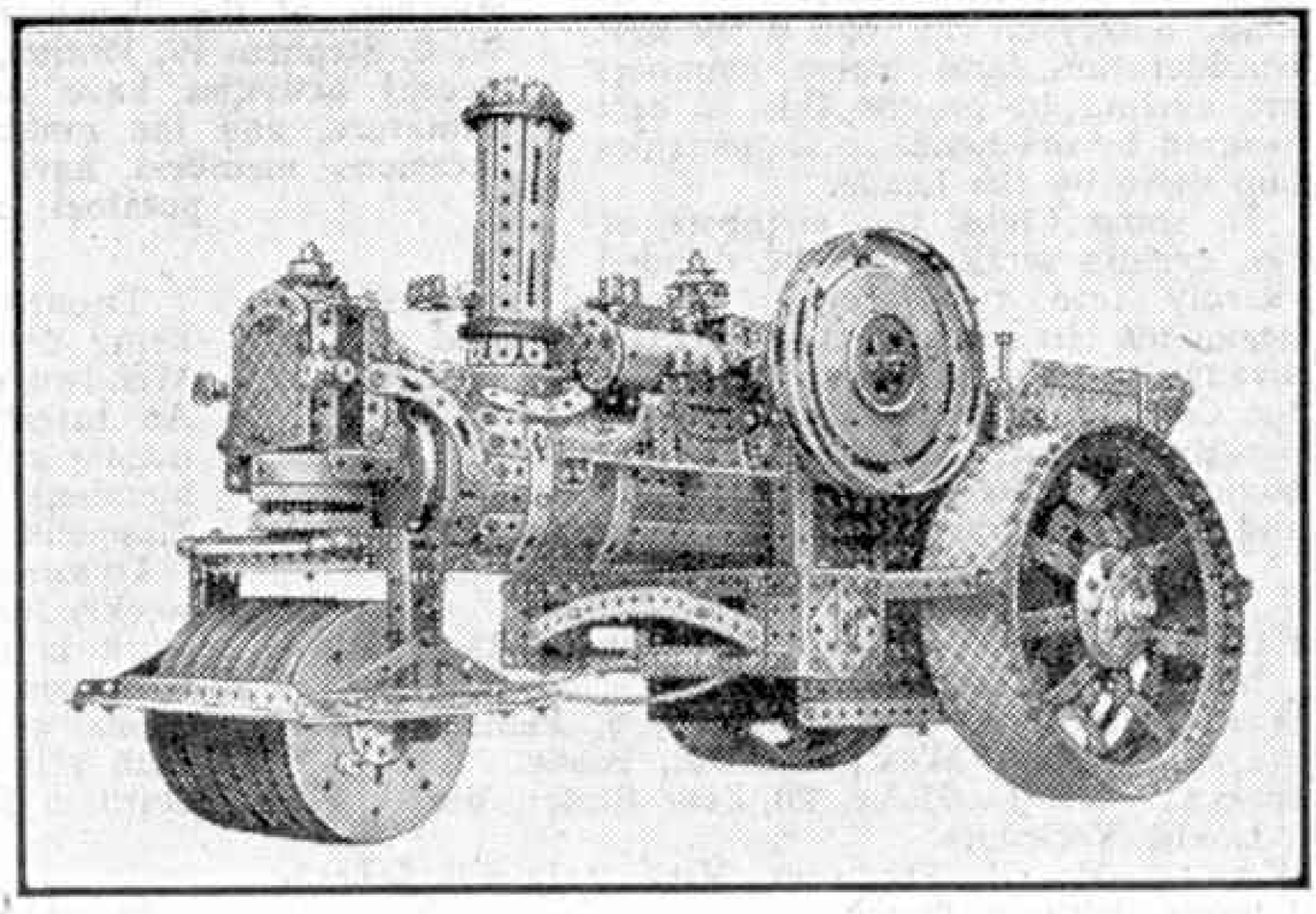
The best model received was the work of R. Parkerson, a competitor in Section A, and took the form of a man riding a bicycle. The bicycle was not an ordinary machine, however, but was a reproduction of one of those seen at some pleasure grounds, the rear wheel being mounted off centre. The result is that it is very difficult for the rider to keep his balance—especially as there are no pedals! Owing to the rear wheel being journalled off centre, the rider's weight is sufficient to operate the machine. The model built by Parkerson is a very neat and clever piece of work, and this coupled with its original nature earned for it the First Prize in its Section.

Another outstanding entry was a miniature lathe. This was submitted by Michael Bleckwen, in Section B, and secured the highest award in its Section.

A sturdy model of a three-wheeled diesel tractor and a neat reproduction of a diesel-engined tug boat won high awards for John Alexander, and J. Anthony Kennett respectively, both of whom were competing in Section A.

J. A. Draper, who won Second Prize in Section B, succeeded in building a very good miniature of the "*Santa Maria.*" The effect obtained was remarkable in view of the limited range of parts available to the builder.

The Contest appears to have been popular with all classes of model-builders.



This fine miniature steam road roller was built by J. Matthews, Fillongley, near Coventry, and was entered in a Meccano Competition some time ago.

Club and Branch News

WITH THE SECRETARY

ENJOYING THE SUMMER PROGRAMME

I have been glad to note that practically every Club and Branch has set to work to arrange a good Summer programme on the lines that I have suggested during the last two or three months. The outdoor season should be as profitable from a Club point of view as the Winter Sessions, and it certainly will be valuable if outdoor games and other Summer pursuits are followed.

CYCLING RUNS FOR PLEASURE

I am particularly pleased to read in letters from Leaders and Secretaries of the interest that is being taken in cycle runs. Club runs help to encourage the spirit of comradeship that is so essential to Club and Branch work, and cycling in company with other members even takes the annoyance out of punctures and other little mishaps! Willing hands make light work in repairs and any other task that may come along.

Although cycle runs must be carefree if they are to be enjoyable, some organisation is necessary for success. To begin with a definite programme for the season should be arranged, so that members know beforehand what is to be done and can make preparations accordingly. Then a Section Leader is a necessity. This may be the Leader of the Club, or the Branch Chairman, but that is not essential. In most Clubs there is at least one member who is an expert cyclist, and naturally he will take the lead on occasions of this kind. Safety on the road is the first consideration, and where members are cycling in groups this is best ensured by obedience to simple rules laid down by the Leader.

In some Clubs the members of the cycling section can be divided sharply into two groups, seasoned cyclists and beginners. In cases of this kind it is a good plan to arrange two routes to any place visited as a part of the Club programme. One of these should be comparatively short and direct, to be followed by the novices or young members. For the seniors a longer and more arduous route can be arranged.

PROPOSED CLUBS

FARNHAM—Mr. A. Norris, Wiseton Cottage, Weybourne, Farnham, Surrey.

WEST THURROCK—Mr. I. Ellard, 6, Pellings Villas, London Road, West Thurrock, Essex.

MORLEY—Mr. D. Halse, 20, Zoar Street, Morley, Nr. Leeds, Yorkshire.

WITNEY—Mr. R. Ferguson, Minster Lovell Schoolhouse, Witney, Oxon.

PROPOSED BRANCHES

PAPWORTH EVERARD—Mr. D. Hawker, Mockworth, Papworth Everard, Cambs.

NORTHAMPTON—Mr. A. M. Nisbet, 116, Park Avenue, North, Northampton.

BIRCHINGTON—Mr. L. Brooks, 1, Westfield Road, Birchington, Kent.

WHITEFIELD—Mr. A. Lomas, 5, East Drive, Garden Village, Unsworth, Whitefield, Nr. Manchester.

CLUB NOTES

GRASMERE M.C.—Interest and enthusiasm have been increased and an excellent programme is being followed in a good Club room. This contains a piano and a radiogram, which provide interesting diversions. A Film Show is held weekly, and excellent Model-building Meetings also are being held. Club roll: 52. *Secretary:* I. H. Hardman, "Greenburn," Wansfell Road, Ambleside, E. Lakes.

Members of the Tynecastle School, Edinburgh, M.C.; Leader, Mr. W. C. Stephen. W. Motion, Secretary is on the right in the front row. Recent activities have included ship and aeroplane modelling in miniature, and the making of small electric motors. On several occasions members have done good work on farms, harvesting potatoes, etc., during school holidays.

THORNTON GRAMMAR SCHOOL M.C.—Good work is being done in the Aeromodelling, Engineering and Woodwork Sections, and the Library is in good trim. An interesting talk on "*Aeronautics*" given by a master at the School led to many questions from members. Club roll 24. *Secretary:* W. Smith, 20, Masefield Avenue, Chellow Grange, Bradford.

DURHAM M.C.—Meetings are being held twice weekly for Model-building and other pursuits. Woodwork is greatly enjoyed by all members. Recent activities have included Chemical Experiments, "Quiz" and a Lantern Lecture on "*British Battleships.*" Club roll: 6. *Secretary:* T. C. Hindson, Westholme, Durham Moor, Durham.

BRANCH NEWS

SLOUGH—Timetable operations to signal have been carried out on an electric layout with a double line track, a special feature being a large marshalling yard. At some meetings games were played by members. A special meeting was devoted to a discussion on the programme to be followed and many interesting suggestions were discussed. There are special sections for Meccano Model-building and Aeroplane Spotting. *Secretary:* P. R. Gillard, Stoke Poges Lane, Slough.

A Transvaal Dublo Layout

The "South Wingfield" Railway

THE diagram on this page shows the general characteristics of a Hornby-Dublo layout that includes a number of novel features. Some of these have been suggested in these articles from time to time, but the whole scheme is sufficiently interesting to warrant the following description, which is based

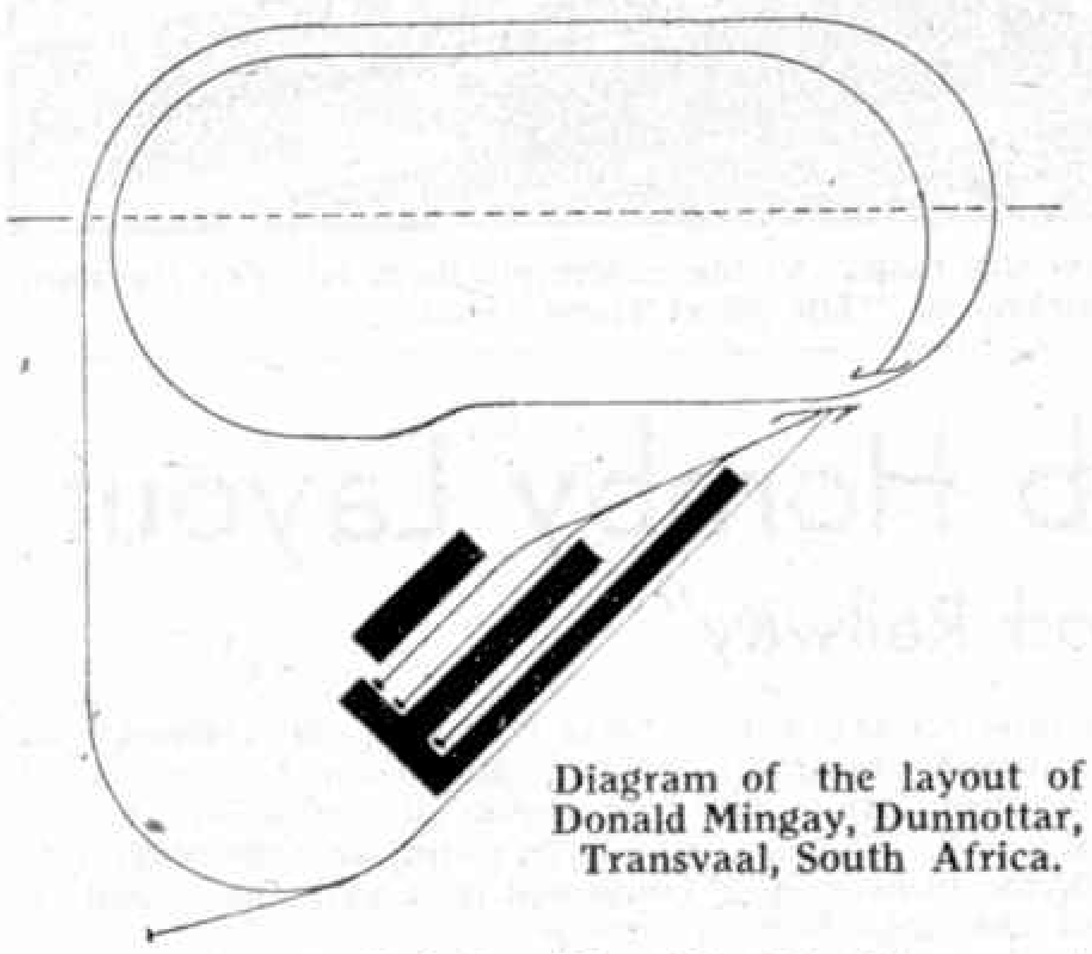


Diagram of the layout of Donald Mingay, Dunnottar, Transvaal, South Africa.

on details supplied by Mr. W. W. Mingay, of Dunnottar, Transvaal, South Africa, the father of the actual owner Donald Mingay.

Departing for a moment from railway topics it may be mentioned that the original plan was drawn on one of the now familiar "airgraph" forms and the resulting miniature print received by the Editor is a model of neatness. This no doubt is quite a novel use for the airgraph!

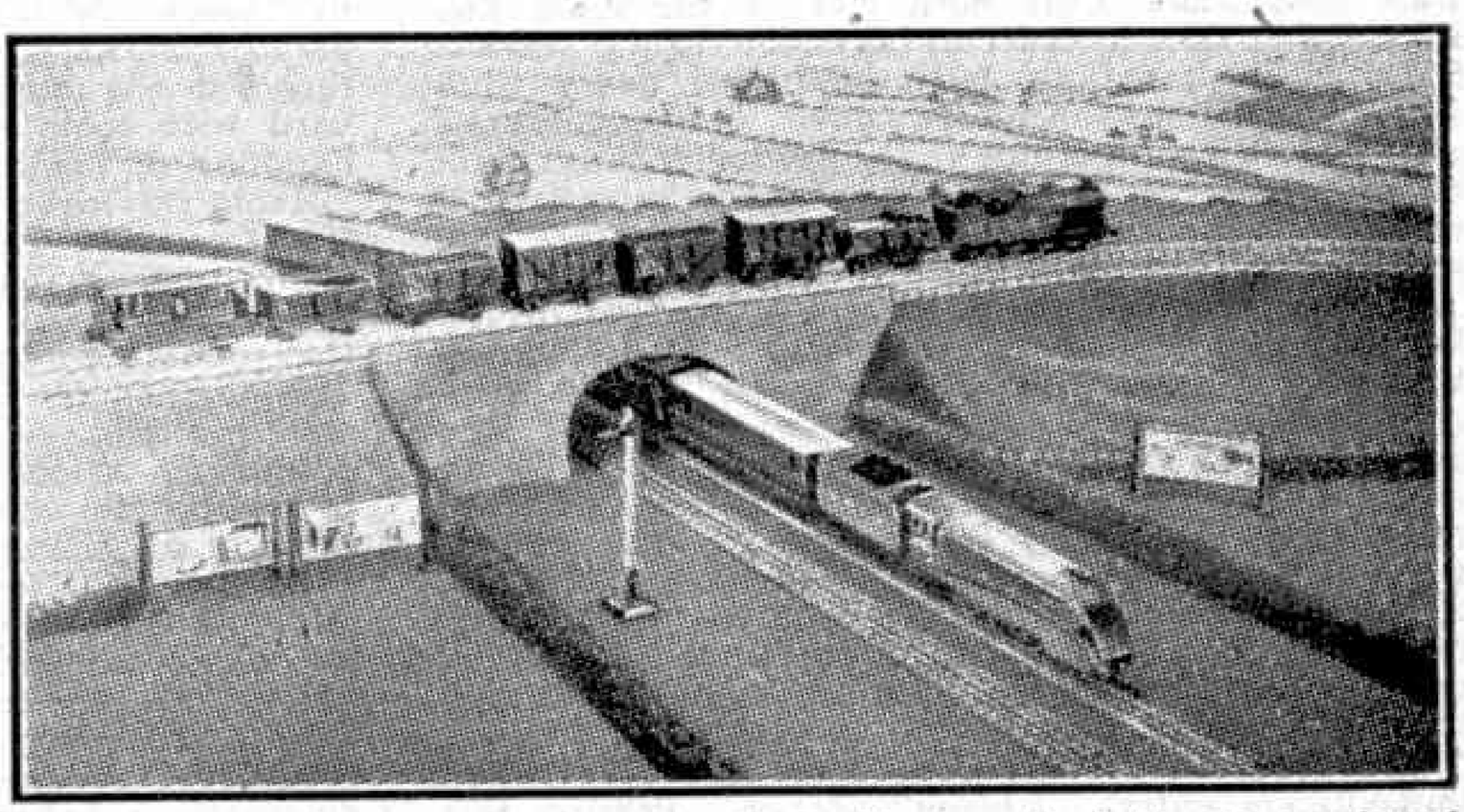
The layout, which is triangular in form, is put down on trestles in a shed out of doors, and full advantage has been taken of the scope thus afforded for permanent arrangements. The total length of main line run is some 34 ft., part of this being accounted for by the special layout of the track in what we may term the upper half of the diagram. The line is so graded that the main line is made to double round and cross over its original course at a most effective bridge before continuing on to the starting point. Actually the diagram makes the situation quite clear, and it will be realised that continuous running is afforded, so that supposed long journeys can be made.

There is only one station but this is well laid out with combined through and terminal platforms. Lying parallel to it, too, is the goods depot, the three dead-end tracks provided converging on to the through main line. As a rule the trains run in a clockwise direction, so that backing out operations are necessary when departures are made from any of the terminal roads. At the opposite end of the station there is a level crossing where road and rail intersect. This is of the boom or "pole" type mentioned on page 136 of last month's "*M.M.*," this form of protection being common overseas as opposed to the usual gates found in this country. Quite a respectable "town" has been developed in the neighbourhood of the station, the various premises including shops, a Post Office and a cinema. In the lower corner of the layout is a miniature power station serving the little township, and this has a short siding for coal wagons and so on.

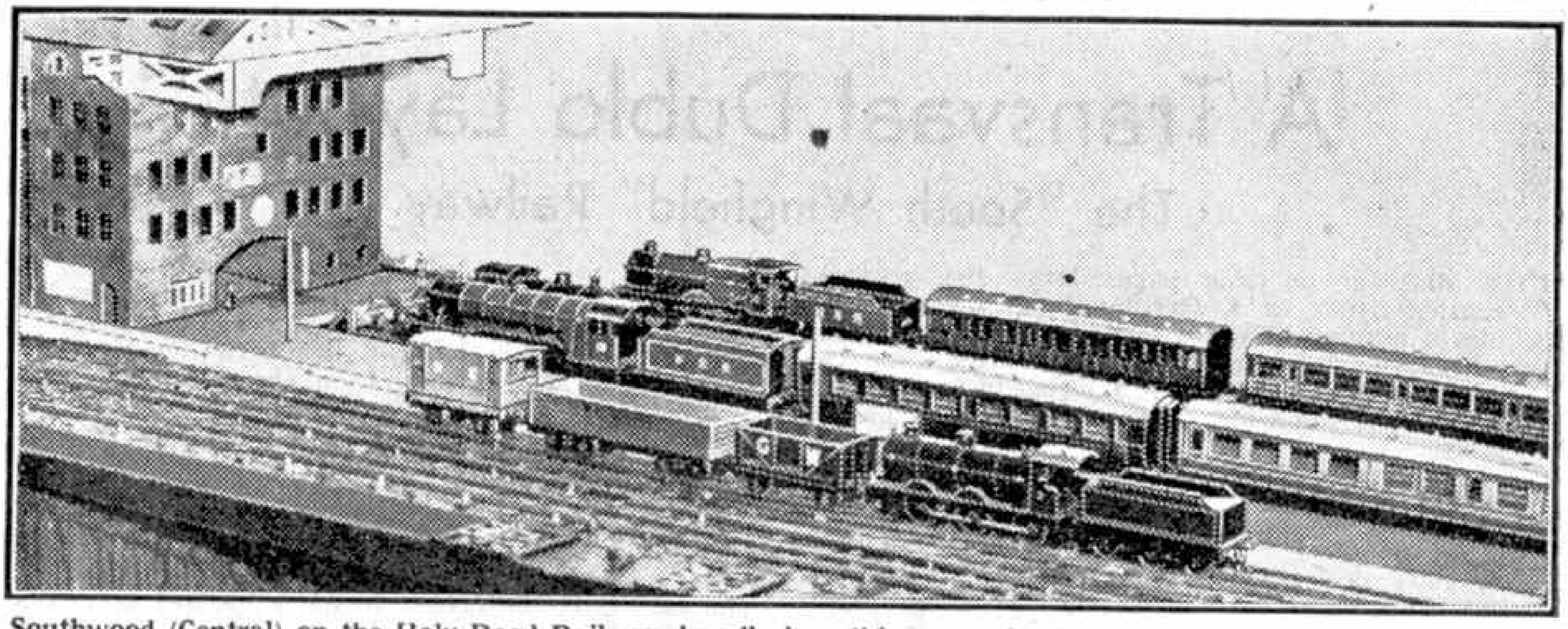
In addition to the buildings various other engineering or scenic features are included, though this part of the work is still in course of development. The fact that the layout includes various gradients in order to provide for the crossing of one track over the other has allowed tunnels to be included in a realistic manner. These carry the track under the gradually rising "country" at various points, and thus screened from view the rails pass behind a scenic background that divides the upper oval in the diagram into two parts.

Apart from its scenic value this feature is made good use of in the course of operations. Trains can be run out of sight into what we may term the "backstage" area. By means of the sectionalising arrangements they be held out of sight in a "dead" section while further operations are conducted in the station neighbourhood. Then when necessary the hidden train can be brought into sight again, having apparently made a lengthy journey. It must be very fascinating for onlookers who are not aware of the track plan to speculate from which tunnel mouth the hidden train is going to emerge! Similar schemes have often been employed on demonstration layouts, but it is not very frequently that one comes across the idea on a privately-owned line.

Power is supplied from the mains through a Hornby-Dublo Transformer and Controller unit, and current is fed to the main sections of track as required by means of knife switches. In addition current is supplied to one or other of the tracks at points by means of switches connected to the points operating levers. Thus power is not available on either section unless the points are correctly set. This is a safety measure of considerable value, and prevents the operator from making mistakes which might result in mishaps. Another electrical item is the lighting of the station and certain of the town buildings by means of a 2.5 v. system. This naturally is most effective.



A two-level arrangement on a Hornby-Dublo layout of the kind referred to on this page.



Southwood (Central) on the Holy Rood Railway described on this page. At the centre platform is "The Rainbow Express." Illustration reproduced by courtesy of "The West Herts. Post."

A Remarkable Club Hornby Layout

"The Holy Rood Railway"

THE town of Watford is well known for many things, but no doubt our readers will consider that one of its principal claims to fame lies in the miniature railway system, part of which is shown in the accompanying illustration. This railway forms one of the chief interests of the Boy's Club attached to the Holy Rood Catholic Church, and has been in existence nearly 10 years. The Rev. Philip Oddie was responsible for the beginning of the railway, together with two of the Club members whose names have been adopted for the principal stations on the line "*Southwood (Central)*" and "*Barton*" respectively.

The plan of the "*Holy Rood Railway*" is in general U-shaped and the line is of the end-to-end or non-continuous kind. Its promoters have been fortunate in having plenty of space, for the line makes use of three rooms, passing from one to the other through realistic tunnels driven through the walls. In addition there is an outdoor extension that provides interesting variety in operations as it forms a branch from the main system and terminates in a "dockside" station.

Construction of the railway was a gradual process, in which the three original promoters were assisted by other enthusiastic members of the Club. The "opening day" was a great occasion, when trains were despatched from each end of the main line for the first time in order to begin the regular service. Since then operations have continued every Club Night. Different members have different duties allotted to them according to the particular programme of operations that is to be run off, and the successful results obtained show that the staff take their job seriously.

Let us describe briefly the main features of the line, starting at "*Barton*" in Room 1. This station has two platforms, one being an island, so that there are three platform tracks for passenger traffic. The goods yard includes several sidings and lies at an angle to the main line, a non-symmetrical arrangement that has a very natural effect. In addition there is a locomotive shed and turntable as befits a terminal point. At the head of the yard where the main line is joined is an overbridge, and then the tracks dive into the first tunnel, which carries them into Room 2.

Here the railway emerges from the tunnel and immediately enters "*Lennon*" station. Beyond this station and extending practically to the next one there is a loop line on one side of the track and a siding on the other. Next comes "*Cold Springs*," an ordinary two-road station, and then by means of another tunnel the line leaves Room 2 and enters Room 3. This is a very large room, and the remainder of the railway is all contained in it with the exception of the dock branch outside.

The next important station is "*Warnes Junction*," where a trailing connection to the down main line brings in a branch line from a small station named "*Luca*."

At "*Warnes Junction*" begins a somewhat complex system of connections by means of which the main line may be said to divide; one section going on to "*Southwood (Central)*" while the other, running practically parallel, serves "*Southwood (Hampton House)*" before reaching the last tunnel, which gives access to the open air extension. Taking this latter length first, the branch line reaches "*Kenton Bridge*," a small halt, crosses the girder bridge from which the halt takes its name, and finally reaches "*Beckett Docks*." Here there is an island platform and also a turntable and a siding. Ocean traffic is dealt with here, and boat trains are worked in and out connecting with steamer sailings.

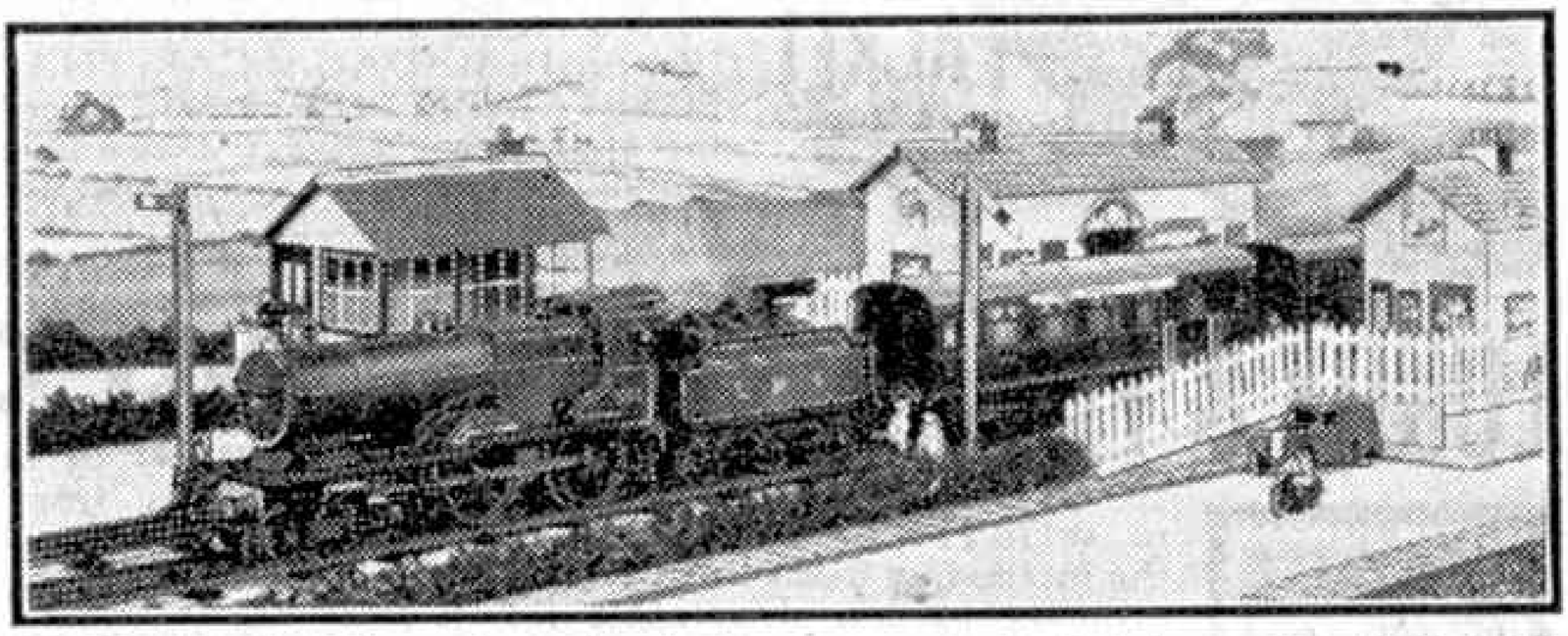
Returning to the junction, we find that the line to "*Southwood (Central)*" develops into a series of parallel tracks, three of which serve the platforms shown in the illustration. The others form the goods yard with loop and reception roads for the rapid handling of loaded and empty trains.

Train services on such a system can hardly fail to be interesting. The timetable is well arranged and is complete with the usual footnotes referring to some special feature of the working. From it we learn that certain services are provided by slip coaches. This method of working was once very popular on real and also on miniature railways, but is now practically a lost art. It includes the detachment by special slip couplings of a coach or coaches from the rear of an express when approaching the station to be served. The main portion of the train carries on while the slip portion is brought into the station by its own momentum, checked as necessary by brake power under the control of the slip guard who travels with it. In miniature a mechanical uncoupling device is usually arranged to work from a ramp or trip alongside or between the rails, the distance of this from the station being first determined by experiment. It is quite an effective operation if properly performed.

Fun With Your Hornby Railway

Standard Loads for our Engines

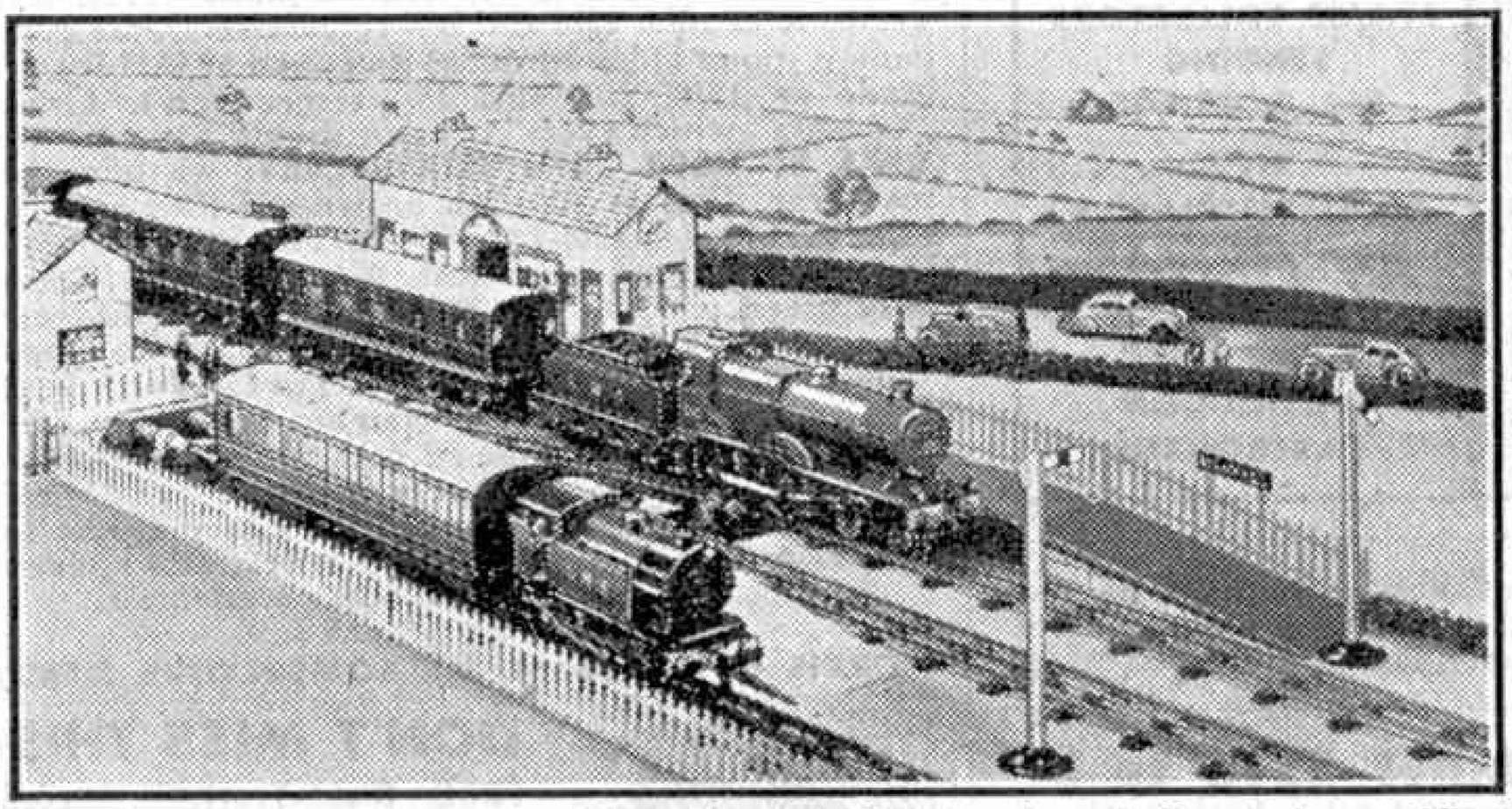
NOWADAYS most miniature railway layouts of the temporary kind have to be accommodated in less space than in normal times. This means a more restricted layout, fewer or smaller station layouts, and less room in which to place our rolling stock. Instead therefore of running trains of considerable length, as we might like to do, we take the obvious course and cut down our formations to a length that can be handled easily in our restricted sidings, or at our station platforms. There is no satisfaction anyhow in having a train that is a nuisance in either of these respects and our war-weary engines will appreciate some reduction in their normal loads. We can keep traffic moving better and operations can proceed with a regularity that is not possible when heavy trains of indefinite make-up are included in the programme.



A Hornby L.M.S. system showing an express hauled by a No. 2 Special Standard Compound.

We can therefore attempt to fix a standard load for each class of engine, both for passenger and freight working, and make it a rule not to exceed the number of vehicles laid down as a maximum. Certain trains for instance, if timetable working is practised, should not be allowed to take up additional van- at any point, and this will apply particularly to our best expresses. The classification of engines according to their loads on standard timings is of course a feature of L.M.S. practice to-day, and has come down from the highly developed system in vogue on the former Midland Railway.

This "Midland" scheme, for such we may term it, can be applied very appropriately in miniature, and it is of particular value on clockwork layouts where the power of the engine is naturally restricted. It is of course of use also where electric locomotives are employed and ensures regularity of operation. There is no need always to make up our trains to the standard load; one vehicle less will be a good rule, and will allow for extra traffic being dealt with when required, without overloading the engines or causing inconvenience at stations. Then, when an occasion of extra traffic does occur, and miniature railway managers are always keen on providing for this, the train can be made up to its maximum and operations will still proceed smoothly.



"Hornby Junction, change for Binns Road." Note the branch line train providing connections with the main line services.

Having determined our loading limits we should note them down in handy form so that they are always available for reference. This is useful in any case, but is particularly so when the railway is not operated frequently, or perhaps is put away when running is over, as we shall be anxious to get to work without delay when the opportunity arises. In real practice it is usual to state the load limits in tons, but this cannot always be done conveniently in miniature. However, we hope to refer particularly to the question of Gauge 0 "weights and measures" in a future article, as this is quite a fascinating branch of the miniature railway business. For the moment it will probably be sufficient to adopt the four-wheeled coach as a unit and to consider a bogie coach as being equal to two four-wheelers. The same procedure can be followed for goods vehicles.

The method is only approximate and possibly adjustments may have to be made where unusually heavy or light vehicles are included in the stock; these however can be left to the judgment of individual operators. A similar method of reckoning loads was widely used at one time on real railways; and although actual weights form the more usual method now, working arrangements often state the number of vehicles to be used.

Although the "limited load" scheme can be applied to any miniature railway, whichever company it follows, it is specially applicable to a model L.M.S. system. Scenes on Hornby layouts representing the L.M.S. are shown in the illustrations on this page, the express engine in each case being the familiar Standard Compound.

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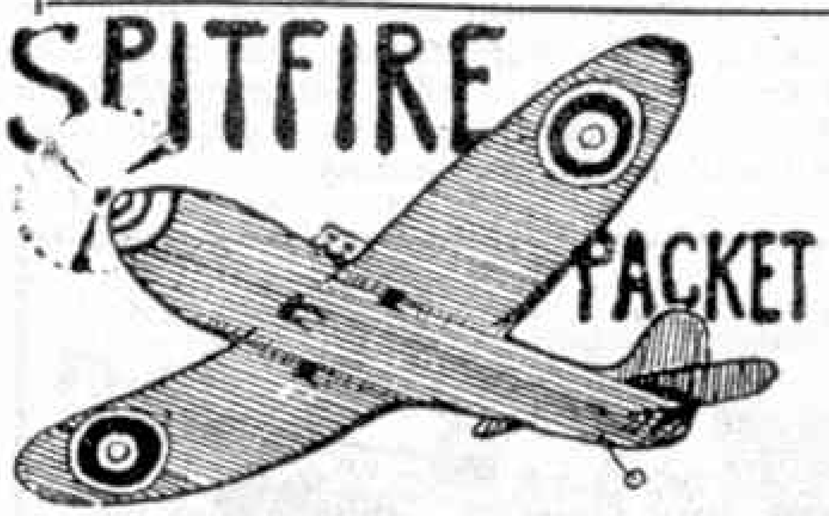

PACKET contains 30 air, triangular, and stamps with aeroplanes, etc.—2 LIBERIA triangular (with aeroplane); NIGERIA; F. OCEANIA; MOZAMBIQUE (Elephants); INDIA; 2 Canada; S. AFRICA (Pictorial); 2 TANGANYIKA; PALESTINE; BRAZIL (aeroplane design, etc.); 5 U.S.A.; ICELAND (Fish); Australia; CAYMAN IS. (Pictorial); NEW CALEDONIA; CAMEROONS; ST. PIERRE; MOZAMBIQUE (Pictorial); MADAGASCAR; PHILIPPINE IS.; CEYLON (Pictorial); EGYPT; JAPAN (Emperor). Price 5½d., post 2½d. extra. Applicants for approvals receive 6 Pictorial S. Africa and in addition, those sending addresses of stamp collecting friends get set of 4 JAMAICA. **BARGAINS**—100 B. Cols. 2/6; 12 Free French (Cols.) 9d.; 20 Rhodesia 1/6. ASK for LISTS 1d. **H. C. WATKINS (MM), Granville Road, BARNET**

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For other Stamp Advertisements see also pages 176 and viii.

Stamp Collecting

The Stamps of Malaya

By F. Riley, B.Sc.

THE last country at which we called in our stamp tour of the Empire was Burma. It is natural to pass from there to the Malay Peninsula, which is of special interest to-day because of its wartime fate. It was over-run by the Japanese before they entered Burma, and its stamp history as far as the Empire was concerned was thereby brought to a sudden stop for a period that we hope is now approaching its close.

The Malay Peninsula thrusts far southward from the borders of Burma and Siam, and has the famous island of Singapore at its tip. The Peninsula itself has a mountainous backbone running through it, sloping down to fertile lands and a sandy shore on the eastern side where it faces the South China Sea, and descending on the west to mangrove swamps along the shores of the Straits of Malacca, one of the great highways to the Far East. The climate is hot and moist, and the country is fertile. Once it was almost a roadless jungle, but now rice is grown in abundance, coconut palms and tropical fruit trees abound, and during the present century the country has become the great home of the rubber tree.

The presence of the rubber tree in Malaya is one of the romances of industry. The natural tree is a South American product, and many years ago seeds of it were smuggled out of that continent and planted at Kew. Then seedlings were taken to Malaya, where they were found to grow splendidly, and the result was the establishment of the great plantations that in pre-war days supplied every part of the Earth with rubber for motor car tyres and countless other uses. Another important product of the Peninsula is tin, and articles in the "*M.M.*" have described how the tin ore is mined and the metal extracted from it. One interesting feature of the tin industry is the great part played by Chinese, who have settled in the Malay Peninsula in enormous numbers, partly for general trading purposes and partly for working the tin mines and washing the metal out of the alluvial deposits in which it occurs.

When we turn to the stamps of this country we find a remarkable variety, due to the fact that there are many native States in it. Some of these work together, and so we get the general issue of the Federated Malay States, but the States themselves at various times have issued their own stamps. Other States have remained separate, in all cases with British advisers to give guidance to their rulers, and these States have issued their own stamps. There have also been stamps for the Straits Settlements, that is Singapore, Penang, Malacca and other parts of the area that have come under direct British rule. It is interesting to find that the Straits Settlements now include Labuan, an island off the north coast of Borneo, that issued its own stamps until 1906, together with the Cocos-Keeling Islands and Christmas Island, hundreds of miles away in the Indian Ocean.

The stamp story of the Straits Settlements began in 1867, but the stamps of India had been current there from 1854, when the Settlements came under the control of the Government of India. The cause of the appearance of Straits Settlements stamps was the elevation of the country to the position of a Crown Colony. As so often happened in cases of this kind, the first stamps to be used were those of India with the name of the new Colony overprinted; and as there was a change in currency from the rupees and annas of India to dollars and cents, a new figure of value also was necessary. These stamps are somewhat rare, in comparison with the Indian stamps of the same designs previously in use, but this is only to be expected in view of the fact that they were in circulation for only three months, Straits Settlements stamps of new design appearing in December of the same year. These were attractive portrait stamps, and portrait stamps have remained the rule ever since, apart from the Silver Jubilee and Coronation issues. Some of these portrait issues have been of the tablet variety, but more recent ones have included palms and Malay daggers in the designs with good effect.

It is curious that the modern tendency for bright and attractive pictorials has not extended to the Straits Settlements, which certainly provide good material for designs in the varying races and industries of the country. The stamps of certain native States are better in this respect, for they include designs illustrating chiefly the wild life of the country. The tiger is a great favourite, and perhaps the best of the tiger stamps is the one illustrated on this page, which appeared in 1900, when the Federated States first issued general stamps for joint use. Elephants too made their appearance on the combined issues at this time, the dollar values showing a fine group that had previously been used for the issues of Perak and Selangor, two of these States. Yet another interesting pictorial among these issues shows a mosque at the palace at Klang, in the Federated State of Selangor. This is reproduced here and is interesting because the name "Malaya" appears in English, while that of the State is seen under the picture and is in Malay script. Apart from this one example the names of separate States issuing stamps appear in English too.

There are four of these States, and formerly there were five. All of the States issued their own stamps to begin with, and they have done so again in recent years, the combined issues appearing between 1900 and 1935, so it will be seen that there is plenty of variety.

The stamp-issuing States not federated are also four in number, Johore, Kedah, Kelantan and Trengannu. Most of their stamps are of the portrait variety, an excellent example being that of Johore illustrated on this page. Kedah has provided the only pictorials, and these suggest what might be done if and when the modern trend is followed in Malaya. The Kedah stamp illustrated on this page, showing a sheaf of rice, appeared in 1912. Other stamps in the issue show a Malay ploughing.

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For other Stamp Advertisements see also pages 174 and viii.

Stamp Gossip

and Notes on New Issues

By F. E. Metcalfe

IT is not often that there is a special or commemorative British Colonial stamp to chronicle, but this month we are able to illustrate one of the three values, mentioned in the last issue of the "*M.M.*," that have been recently emitted to commemorate the arrival of the Duke and Duchess of Gloucester in Australia. The design of the stamps—all are the same—is quite good, but the colours, lake, ultramarine and indigo, are a bit dingy, as is sometimes the case with stamps printed in Australia. Dingy or not, they are selling like hot cakes, for Australian stamps were never so popular in Great Britain as they are to-day, and moreover this particular set of stamps will become obsolete on 19th May after a run of three months only. If there are any readers who have not yet got their sets they had better grab them just as soon as they possibly can, for once they do become obsolete they will rapidly increase in price.

Another attractive stamp that has been issued recently is from the U.S.A., and the reason given for this emission is the centenary of the State of Florida, that exotic region where the Sun is always shining and grape fruit grow as big as footballs. At any rate so say those who live there, but now that spring is here in England, we don't begrudge anyone their Sun, for our brand of sunshine will do, and it shouldn't be long before we get all the grape fruit we want.

Egypt has issued *another* commemorative stamp, and if the papers are telling the truth, the usual shindy took place when the stamps were placed on sale at the Cairo Post Office. Gibbons for convenience list Egyptian in the British Empire section of their catalogue, and for this reason many collectors of British Empire stamps also take these stamps, but they have no logical place in any Colonial collection, and for one collector at any rate Gibbons cannot remove them quickly enough from Part 1 of their catalogue. All this argie-bargie when Egyptian stamps are issued just sickens one.

Yes, those of us who collect British Colonial stamps have quite a lot to be thankful for. We may grumble that our Post Office is too stodgy for words. It probably is, but if one must choose between stodginess and slickness, which means new commemorative stamps every few weeks, we would surely vote for the former every time. One can have too much of a good thing; and then, instead of enjoying a new set, collectors see through the racket and refuse to buy. Then down in price go the stamps already issued. This has happened in the past with the stamps of several countries, and Egypt is rapidly qualifying for such a boycott.

We came across a very interesting item recently—a stamp issued by Japan for use in Burma. We presume it's that, though it is not claimed that our knowledge of Burmese is as extensive as it might be. It is a shoddy production, in keeping with most things Japanese, but by the time these words are in readers' hands such stamps will have been replaced by stamps of India overprinted for use in the recaptured parts of Burma, which may be most of the country. There is no definite news yet, but these Indian "overprints" can only be of a temporary nature, so a set should be bought as soon as available.

Last month it was mentioned that certain Colonial stamps may be changed or even dropped and more rumours continue to float round regarding other stamps. It is said that the 2½d. Nigeria and the 5d. values of Sierra Leone and Fiji will be dropped in the near future, and these stamps are already selling at more than double face value. Now, if one needs these stamps for a collection by all means buy a copy, but don't buy any for speculative reasons, for it is almost certain that some at least of these rumours come from sources anything but disinterested.

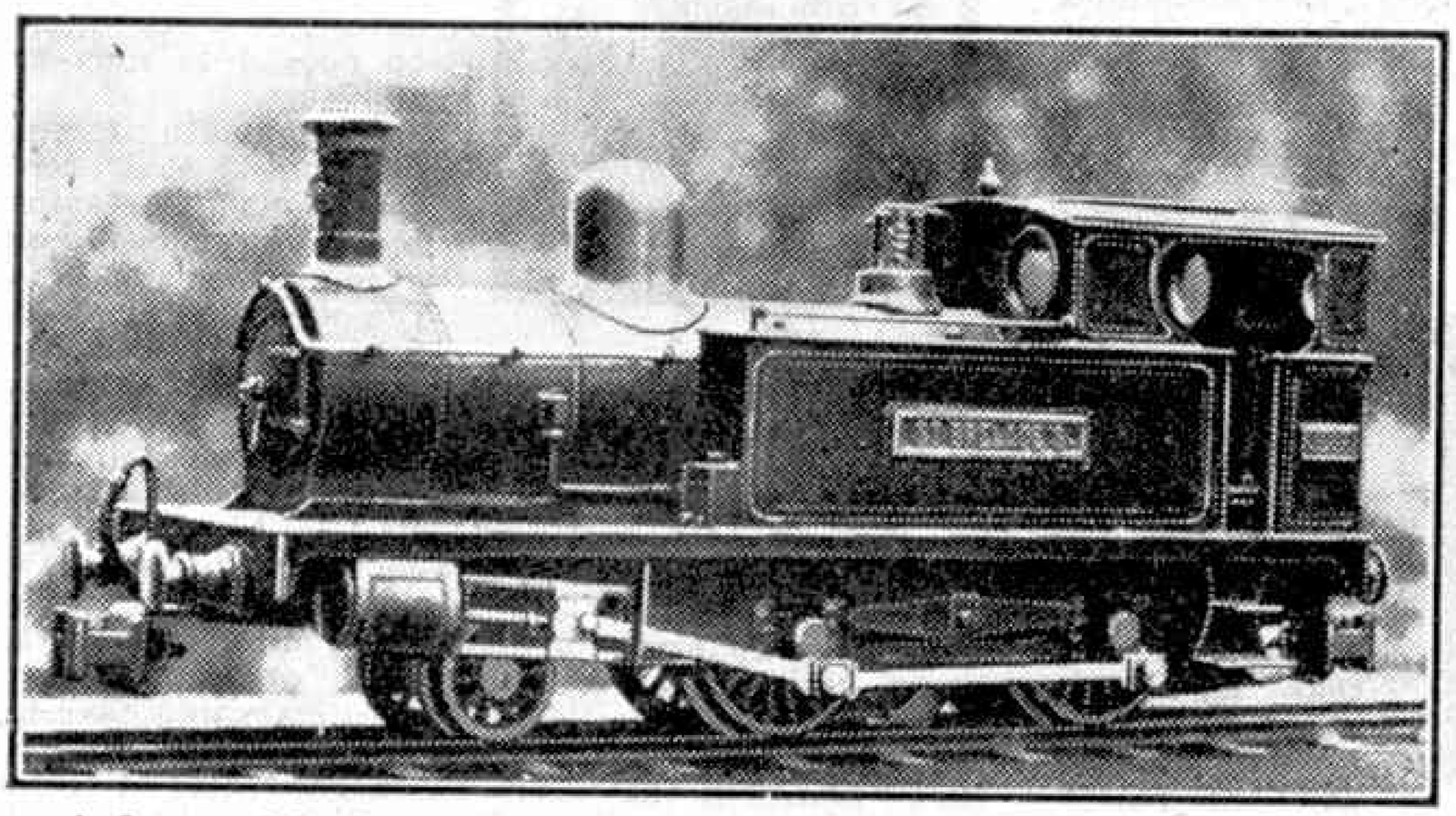
An old collector remarked the other day that apparently the only object modern collectors have in view is the money side of their hobby, and it has to be admitted that there was a good deal of truth in this stricture. Of course collectors always did keep an eye on the main chance, but it seems to be getting worse, and that's a pity, for there is going to be a very cold morning one day, when some of these "snips" are offered for sale. It's all very well to say that a stamp has gone up in the catalogue, but that is anything but synonymous with a profit having been made, for there is generally a big margin between what a dealer will pay and the catalogue quotation of a collection. If you only propose to buy so that you may sell later at a profit, think twice and then don't. Ignore that advice, and one day you may be sorry. Buy all you want for your collection. Buy as cheaply as you can, if the stamps you are buying are in good condition, but leave it at that. Be satisfied to leave one of the best of hobbies just a hobby.

Some collectors must have got quite a shock when they heard that the 10/- Cayman had been reprinted perforated as it first appeared in 1938. This means that a stamp recently worth about 30/- is now worth about 12/6. The same thing can happen to the £1 Kenya and the 10/- Granada; so look out. Of course the new printing of Cayman is on very white paper and has colourless gum, but after being out in the colony for a few months it will be hardly distinguishable from the original printing.

AN INTERESTING 00 GAUGE TANK LOCOMOTIVE

The illustration on this page shows a particularly neat model tank locomotive built to run on 00 gauge rails. It represents a 2–4–0 tank of the 3 ft. 6 in. gauge Jersey Railways and Tramways system. The model formerly ran on the 00 gauge railway of Mr. V. Boyd-Carpenter, Worksop, to whom we are indebted for the illustration. Now, however, it is used on a "narrow gauge" line that forms part of the same owner's 0 gauge G.W.R. layout, the quarry line being laid with Hornby-Dublo track.

The engine is powered by a Hornby-Dublo electric motor adapted to the 2–4–0 wheel arrangement with outside frames and cranks. The bodywork is made of German silver and the boiler mountings are of brass, and an interesting detail is the appearance



A fine model of a 2-4-0 Tank on the railway of Mr. V. Boyd-Carpenter.

of the engine number "4," on the front of the chimney. All the fittings are especially neat, and the name and maker's plates are engraved and perfectly legible. The model was built to the original drawings prepared for the real engine in 1895 by W. G. Bagnall and Sons Ltd., Stafford.

Facts About Steel—(*Continued from page 155*)

certain characteristics, and these are given by adding to the basic composition of the steel special alloys, such as tungsten, chromium, vanadium, etc.

While innumerable compositions of die steels exist, four main groups are the most important. These comprise the standard die steels, the steels for dies for work on hot metals, the die steels for forming plastic materials, and the steels for making dies for the production of die castings.

The standard steels resolve themselves into (*a*) a higher grade die steel of high chromium, high carbon, molybdenum type; (*b*) a non-distorting tungsten-chromium-manganese type. Both these can, of course, also be used on plastics, as well as for tools other than dies. The higher grade steel is designed for long runs and the severest service, and wherever a steel rather better than the standard is needed. If correctly hardened, it will not warp or distort when heat-treated, and its cutting edges will stand up longer than those of ordinary die steel.

The non-distorting die steel was perfected to meet the demand for a tool steel that would minimise the shrinking, warping, cracking, and distortion, that occur with ordinary tool steels when hardened.

The hot die steels are primarily intended for pressing or squeezing dies. There are two qualities, one a higher grade designed to resist shock and heat met with when used on hot metals, the other for similar work under less exacting conditions. One contains a basis of tungsten, chromium and vanadium; the other is a chromium steel.

Enough has been written to show the extraordinary diversity of tool steels available to the modern manufacturer, but boys will mostly have to do with carbon tool steels, and when the pen-knife is picked up to be returned to the pocket, it may, perhaps, be examined with a little more interest as a result of the facts enumerated in this article.

Rare Butterflies of Britain—(*Cont. from page 151*)

for Nature's beauties, discovered this strange butterfly in her garden and depicted it in coloured silks on her sampler. There is only one known record of this butterfly having taken up residence in England. In the Summer of 1906 an entomologist saw a large number of Bath Whites emerging along the cliffs near Lulworth Cove, and he captured a couple as a permanent record of this unusual sight. The remarkable part of this story is the lucky coincidence that a naturalist who could recognise the butterflies should pass by that morning, before they all flew away!

Keep a look out for the Long-tailed Blues that come over from Europe some years. They are rather like some of our British Blues at a distance, particularly like the Holly Blue, but if you can get close enough they are quite easy to recognise by the tiny curly tail at the base of each lower wing. I had one of these rarities brought to me alive a couple of years ago. It had been caught in a garden at Ditchling, in Sussex, but unfortunately it was only a male, so I could not breed from it in captivity on my Butterfly Farm.

It is a fascinating and sometimes quite exciting hobby, looking for rare butterflies on your walks through the country-side. Along the south and south-east coasts are the most likely places to see the migrant butterflies, and one day you may even be lucky enough to catch a glimpse of the Giant Milkweed butterfly, with a wing span of over four inches. These huge butterflies come all the way from America, but it is not certain yet whether they come as "stowaways" on board ship, or cross the Atlantic on their own wing power.

How Cider is Made—(*Continued from page 161*)

passed under jets of warm water before being taken by conveyor to the automatic labelling machine, which applies the side labels and printed stopper straps, working at the rate of about 2,500 bottles a day. Labelling done, the bottles are ready to be cased and sent to storage pending despatch.

This article is reprinted from the "*Great Western Railway Magazine*" by courtesy of the Editor.

COMPETITION RESULTS (Overseas)

April "Locomotive Jumble" Contest.—1st Prize: M. A. Macdougall, Abbotsford; 2nd Prize: A. E. Elvey, India; 3rd Prize: M. Laubscher, Johannesburg. Consolation Prizes: T. Boocock, Canterbury, N.Z.; A. Owen, Claremont.

April "Photographic" Contest.—1st Prizes, Section A: N. Tasker, East Malvern, S.E.5; Section B: A. Figg, Nova Scotia. 2nd Prizes, Section A: T. W. Pattison, Quebec; Section B: N. Moore, Via Merredin, W.A. Consolation Prize: J. Lapine, Missida, Malta.

May "Crossword" Puzzle.—1st Prize: N. H. Aldridge, Johannesburg; 2nd Prize: W. Warren Jenson, Whangarei; 3rd Prize: N. Saliba, Rabat, Malta, G.C. Consolation Prize: M. Munro, Woodville, N.Z.

Competitions! Open To All Readers

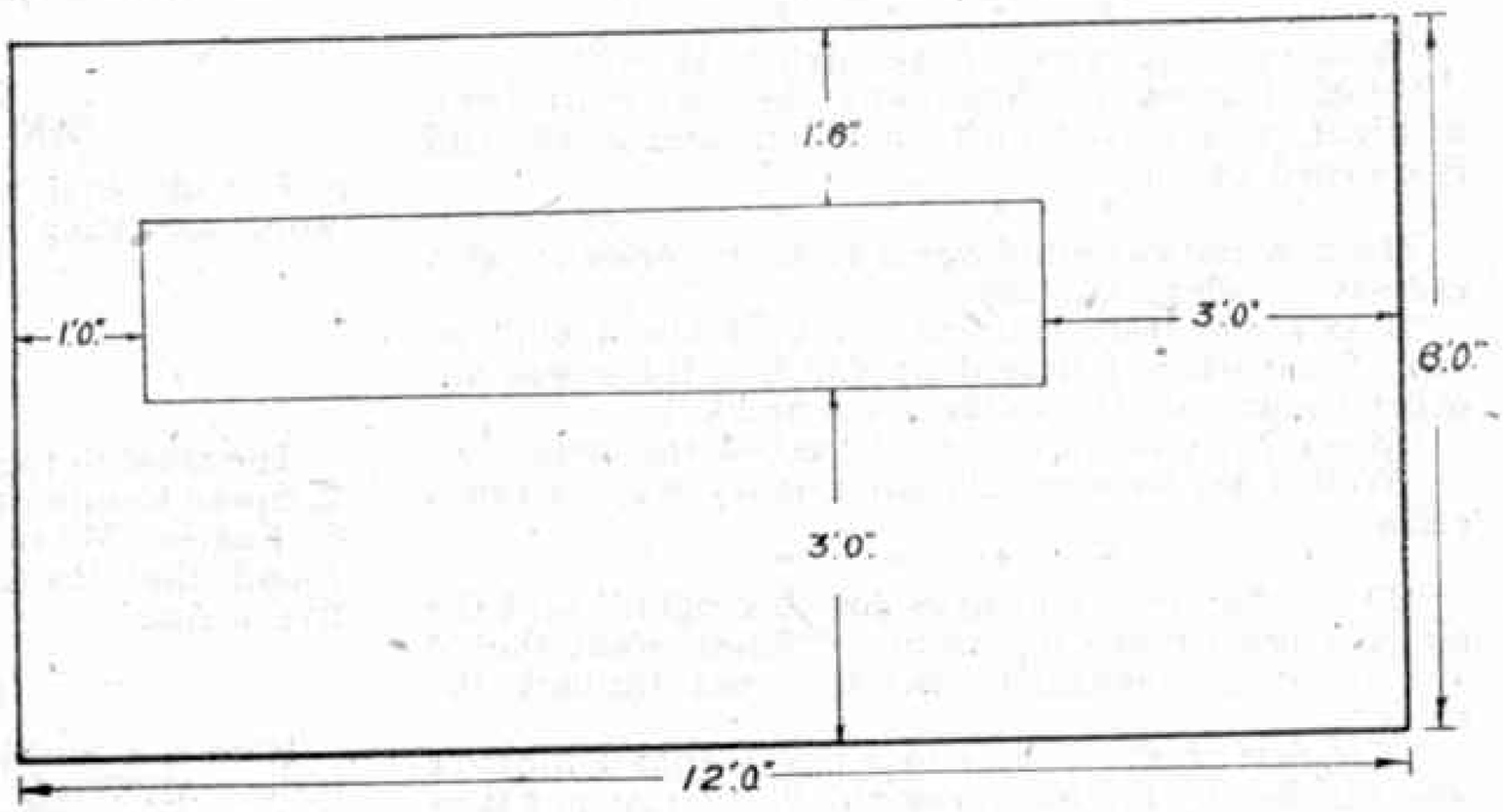
Layout Planning Contest

This month we ask competitors to submit designs for a model railway layout on the baseboard illustrated on this page. This is 12 ft. long and 6 ft. wide, and a space 8 ft. by 1 ft. 6 in. is cut out of it, as shown in our illustration.

The layouts may be either of the continuous or non-continuous type, and terminal stations, sidings and any other features that the competitor may think necessary to make an interesting railway should be included. Prizes will not necessarily be awarded for the layout that has the most material in it; realism and the possibility of interesting operations will be the basis from which the judges will make their choice.

In order to give a fair chance to all enthusiasts, entries may be Hornby Gauge 0 or Hornby-Dublo layouts. A competitor who chooses the former must show a layout constructed from standard Hornby Tinplate Track, and those who enter a layout for Hornby-Dublo Trains must make use of the standard Hornby-Dublo Track. A scale of 1 inch to the foot should be used in the drawings submitted as entries in this contest.

As usual there will be two Sections, Home and Overseas, and in each there will be prizes of 21/–, 15/– and 10/6 in order of merit for the three competitors whose entries are considered the best. Consolation prizes also will be awarded to other competitors whose entries, whilst deserving of note, are not quite up to the prize-winning standard.



Each entry should be clearly marked on the back with the sender's name, full postal address and age, and should be addressed: "*May Layout Contest, Meccano Limited, Binns Road, Liverpool 13.*" Closing dates: Home Section, 30th June; Overseas Section, 31st December.

A Colour Drawing Competition

Our second contest this month is one giving readers an opportunity of exercising their colour senses. It is a drawing contest of a special type, in which the entries must be reproductions in colour of "*M.M.*" illustrations. The illustrations may be chosen from any Magazine issues of 1945, up to and including the May issue, in which this announcement appears; the only ones that are excepted being the cover subjects, which of course are already in colour. Readers will find it very interesting to reproduce a chosen picture and to give their ideas of the colours that would be most suitable or accurate for the subject represented. There is no restriction as to the manner in which the colour is done. Coloured pencils, crayons or inks can be used, and those who are at home with water colours can make use of them if they wish.

As usual in our drawing contests there will be two Sections, A for those of 16 years of age or more, and B for those under 16. In each section prizes of 21/–, 15/– and 10/6 will be awarded to the three best entries in order of merit, and other good efforts will be recognised by the award of Consolation Prizes. There will be separate sections for Overseas readers.

Entries in this Contest must be addressed: "*May Colour Competition, Meccano Magazine, Binns Road, Liverpool 13.*" Entries in the Home Sections must reach this address not later than 30th June. The Overseas Sections closing date is 31st December.

Competitors are reminded that prize-winning entries are retained by the Editor. Unsuccessful entries will be returned if their entrants wish, but only if they are accompanied by stamped addressed envelopes.

May Photographic Contest

This month's photographic contest is the 5th of our 1945 series, and in it, as usual, prizes are offered for the best photographs of any kind submitted. There are two conditions—1, that the photograph must have been taken by the competitor, and 2, that on the back of the print must be stated exactly what the photograph represents. A fancy title may be added if desired.

Entries will be divided into two sections, A for readers aged 16 and over, and B for those under 16. They should be addressed: "*May Photographic Contest. Meccano Magazine, Binns Road, Liverpool 13.*" There will be separate sections for Overseas readers, and in each section prizes of 15/– and 7/6 will be awarded. Closing dates: Home Section, 31st May; Overseas, 30th November.

Fireside Fun

"You have your socks on inside out."
"Yes. My feet were hot, so I turned the hose on them."

* * * *

Mrs. Nuwed: "It's a pity you can't finish your dinner; I shall have to give it to the dog."
Mr. Nuwed: "Yes, it is a pity. He's such a nice dog."

* * * *

"Why were you late up this morning?"
"I set the alarm for seven, but there were eight of us."

* * * *

"When will your father be fit for work again?"
"I don't know, but I think it will be a long time."
"Why?"
"Well you see, compensation has set in."

* * * *

"You say you were up all night! Why?"
"Well, I often wondered why the Sun went down at night, so I stayed up to find out, and in the end it dawned on me."

* * * *

The new railway employee was giving evidence at a railway accident enquiry.
"I saw one train running north at about 60," he said, "and when I looked up the line there was another coming south on the same track."
"What did you do about it?" asked the inspector.
"Well, I ses to myself, what a crazy way to run a railway."

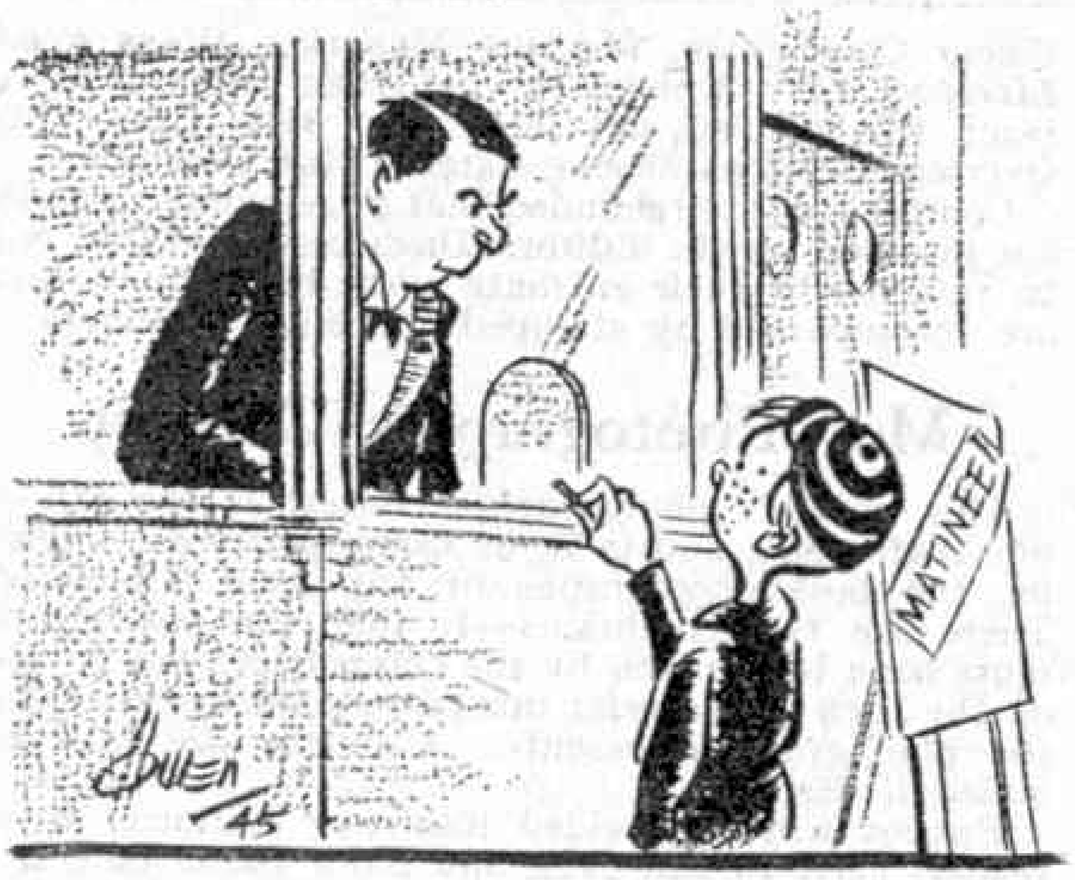
* * * *

"Now let's see if you have got this right," said the air raid precautions instructor. "Jones, what should you do if an incendiary bomb comes through the roof?"
"The first thing to bear in mind is that I mustn't lose my head," replied Jones glibly. "I just put it in a bucket and cover it with sand."

* * * *

A Jewish shopkeeper startled his neighbours by installing a gorgeous new blind.
"That must have cost you a lot of money, Aaron," said Isaac enviously.
"It cost me nothing, Isaac. The customers paid for it."
"The customers? How did that happen?"
"I just put a box on the counter, with a card saying it was for the blind."

* * * *



"Why aren't you at School?"
"It's all right. I've got measles!"

* * * *

THIS MONTH'S HOWLER

A belle is feminine for gong.

"What's the use of timetables if the trains aren't ever to time?"
"What's the use of waiting rooms if they are?"

* * * *

BRAIN TEASERS

AN EASY WORD SQUARE

For our first puzzle we have a word square, each word consisting of five letters as shown below:

X X X X X
X X X X X
X X X X X
X X X X X
X X X X X

The clues to the five words across are: 1, Courageous; 2, Speed Competitor; 3, Seed of Tree; 4, Grass Edging; 5, Eagles. When the square is completed it will be found that the five words down are the same as the five across.

* * * *

POTTED WISDOM

Here is a well-known proverb disguised in a simple code: MFWDQ SSNVAMF UQPTCKD UHMK SQNTAKF USPVCMFR XNT. What is the proverb?

P.J.C.

* * * *

LINKS IN A CHAIN

A word chain consists of 10 words, each of five letters, and the last two letters of each of the first nine form the first two letters of the next. The clues to the 10 words are as follows: 1, Small Recess; 2, Moor; 3, Suffer; 4, Depart; 5, Edge; 6, Birds; 7, Net; 8, Body Fibre; 9, Poetry; 10, Perception. What are the words?

* * * *

SOLUTIONS TO LAST MONTH'S PUZZLES

The front wheel of a bicycle travels a greater distance than the back wheel during a run, for whenever a turn is made this travels in a wider circle than the back wheel.

The overlapping word in our second puzzle is: HASHERAGODEWEELK. I have not yet received any good examples of really long overlapping words of this kind. Hurry up and send them along.

The clue to the solution of the third problem is that there are two figures in the pence column of the smaller sum, and only one in that of the larger. The AE of the smaller sum must be 10 or 11, and only 10 gives a single figure for the pence column when it is doubled. A therefore is 1 and E is 0, while F must be 8. Thus each of the two equal sums is £1/18/10 and the total sum paid out is £3/17/8.

Why was the ancient document in our fourth puzzle a fake? The last words "King Charles the First" gave it away, for during the reign of this King he would always be referred to as "King Charles." Paradoxically there would not be a Charles the First until there was a Charles the Second! To give another example, Queen Anne is never called Queen Anne the First, because there has never been a second monarch with this name.

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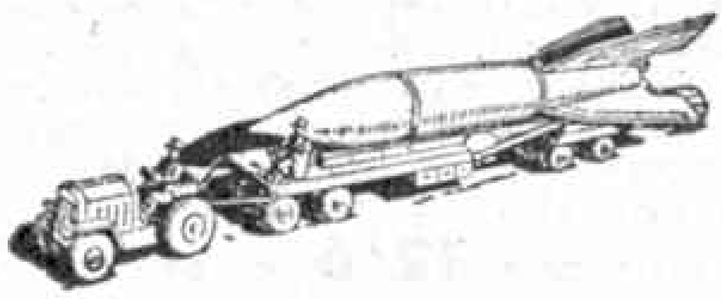

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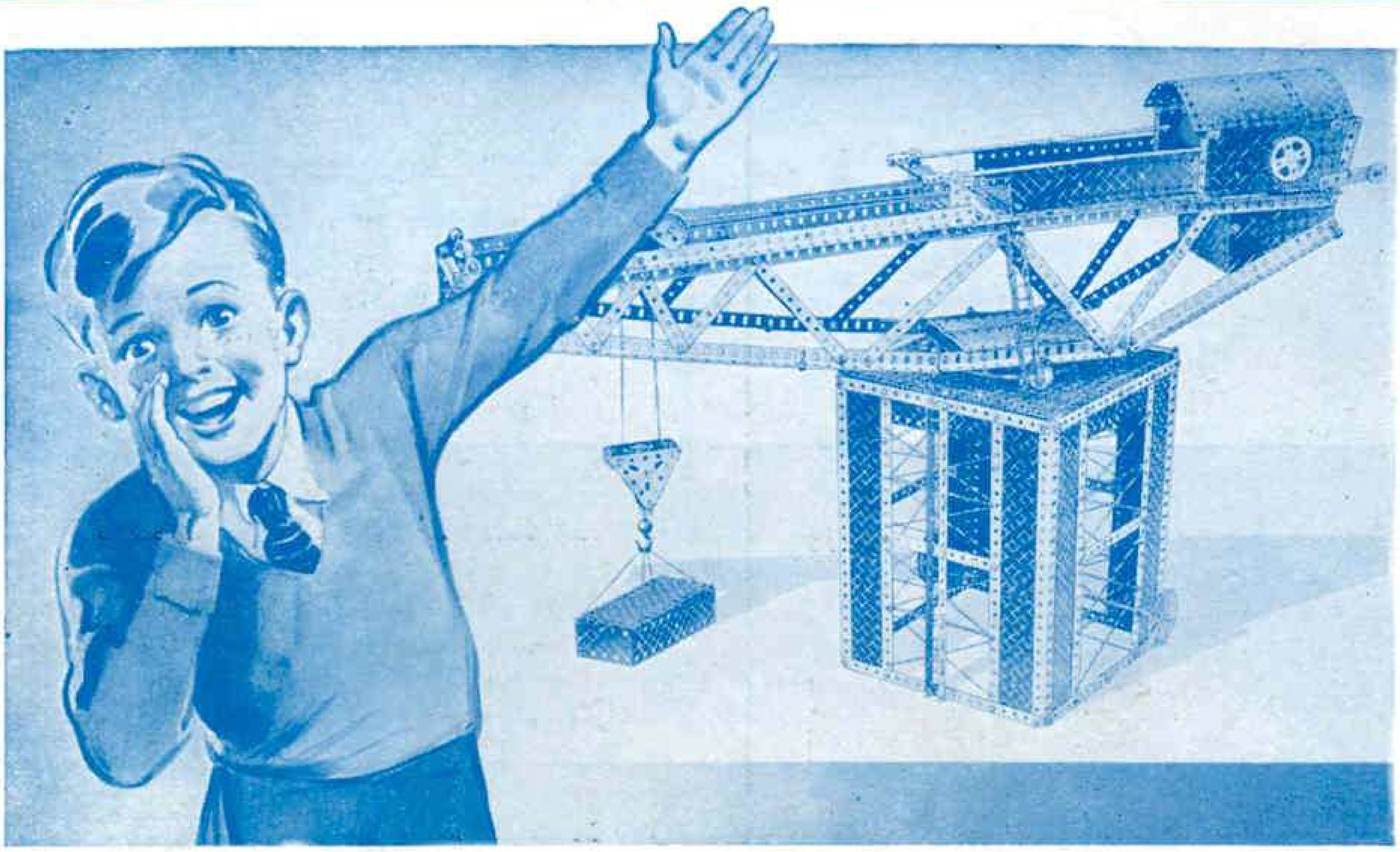

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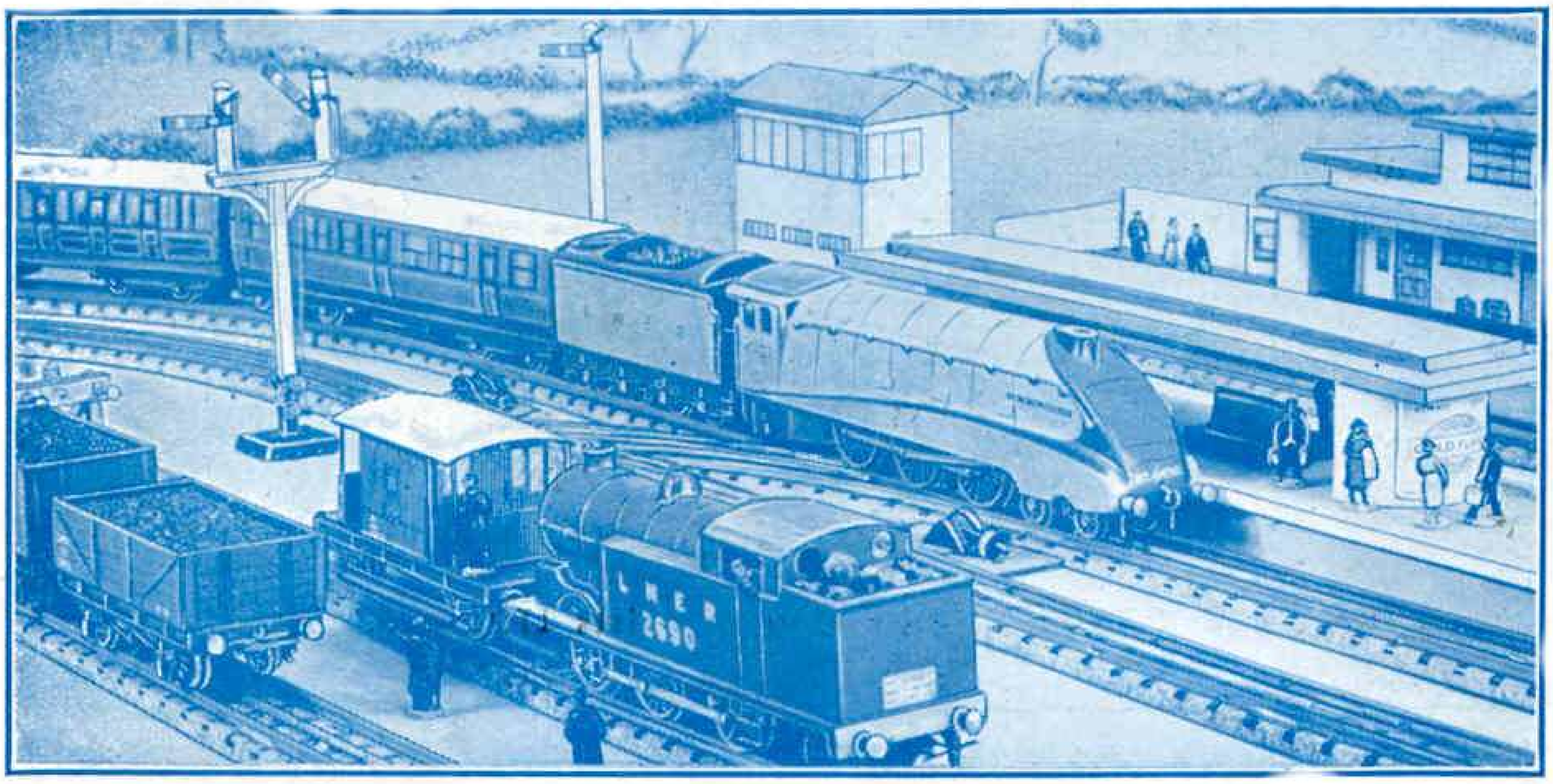

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